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BUSINESS TECHNOLOGY LEADERSHIP

THE EMPOWERED CIO

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Special Report

CYBERCRIME

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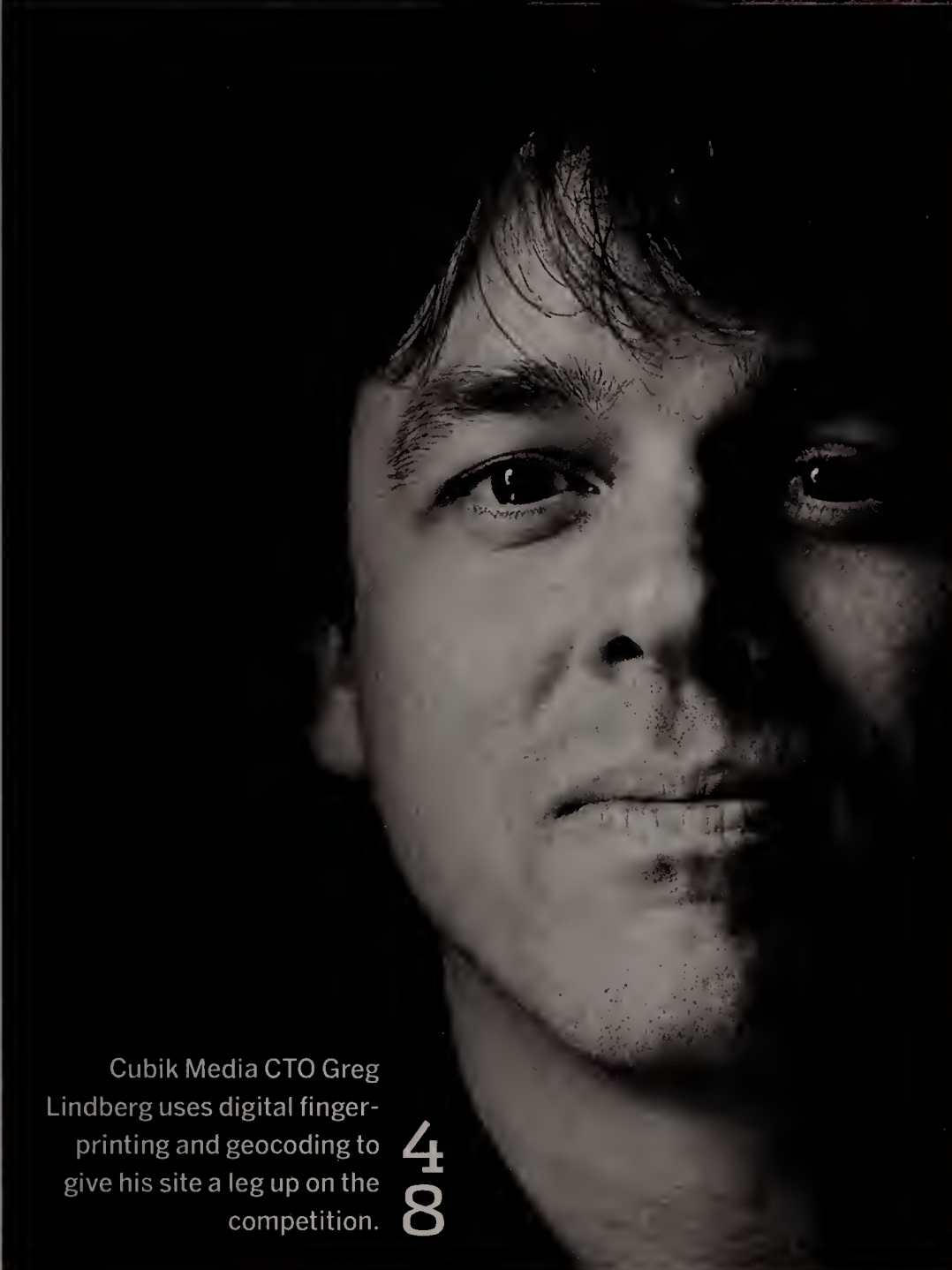
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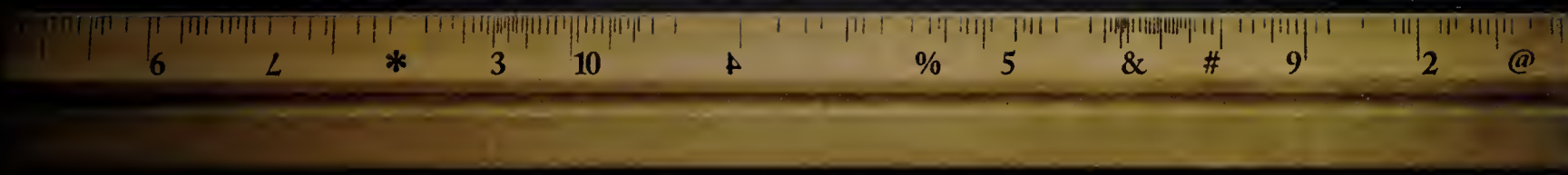
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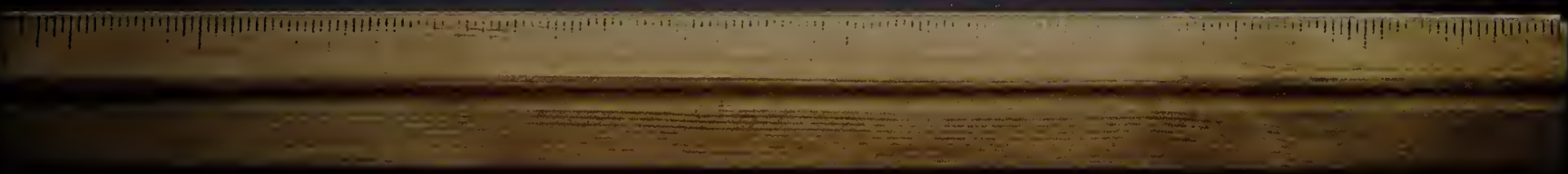
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HOW CIOs CAN BE "GREAT"

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FROM THE EDITOR

Want a Revolution?

Why CIOs should encourage rebellion in the ranks



How does a corporate CIO foster “rebellious insightfulness”? And why would he want to?

That was a big topic of conversation at last month’s annual Finnish CIO conference in Helsinki, where I shared the stage with IDC Chief Researcher John Gantz (IDC is a sister company of *CIO*’s publisher) and Nokia CIO John Clarke. The event was put on by the newly launched Finnish edition of *CIO*.

Gantz talked about four explosions—of data, devices, transactions and risk—and predicted that everything on the IP network will eventually end up in the CIO’s domain, driving IT’s responsibility beyond the traditional boundaries of the organization and deeper into its employees’ briefcases, pockets and homes.

This “hyper-disruption” (as Gantz calls it) is what’s driving the need for “rebellious insightfulness,” according to Nokia’s Clarke, whose company has a lot to do with that explosion in devices. (For an in-depth look at the explosion in risk, check out our special report on cybercrime, beginning on Page 34.)

CIO has written a lot about the incursion of consumer technology into the enterprise. As Clarke put it, “The harsh reality is that the technology employees use at work is inferior to the technology they have at home.” Clarke’s not fighting that reality; rather, he’s planning to harness it. But understanding what customers really want, not just what they *say* they want, requires a deeper engagement with them, he believes. The challenge is how to collaborate with people who are not part of your own organization. Clarke thinks the answer is to create an ecosystem where people can share, collaborate, discuss and interact. In other words, the answer is Web 2.0.

To that end, Clarke is testing and supporting consumer apps, a broader range of devices and is developing more flexible security policies to create a platform for “managed consumerization” in the pursuit of rebellious insightfulness. He’s focusing on new collaboration tools. He has his staff creating mash-ups and exploring virtual worlds, using Skype and working with Amazon’s APIs.

His hope is that all this will ultimately lead to the kinds of breakthroughs Nokia and many other companies are looking for in this time of hyper-disruption.

Are you encouraging rebellion in the ranks? We’d love to hear how and why, and what you expect to get out of it.

Abbie Lundberg, Editor in Chief
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Define Your Limits

What you don't do can be as important as what you do do



Over the past few weeks, it has been my pleasure to meet with some of the brightest executives in the business. I asked them all this question: "What is a simple practice that you do in your organization that helps define your culture and creates competitive advantage?"

I heard lots of great answers. Some were very complicated; others were profound but difficult to replicate in all environments. Some centered on people skills, others on product innovation and process optimization. However, there were two answers that

I thought were simple, brilliant and universally applicable. They both addressed management and each offered incredible value. I bet we think about doing them all the time, but I'll also bet that many of us do not practice them at all.

Jim Collins, author of *Good to Great* and *Built to Last*, suggested tweaking our to-do lists. We all have them. In fact, the number-one thing on my current to-do list is to write this column. But with all the projects thrown at us, it's just impossible to do everything. So when something gets added, what are you telling your team and yourself to stop doing? In other words, your don't-do list is just as important as your to-do list. You can't take care of your to-dos without figuring out your don't-dos. Try it.

The other idea came from Hess CIO Peter Walton. How many of us walk the walk when it comes to rewarding failure? If you really want to create a culture of growth and innovation, chances need to be taken, failure needs to be budgeted for. And when your people fail, do you really accept it, or do you shrug and say, somewhat grudgingly (and perhaps menacingly), "Better luck next time." Well Hess holds an annual ceremony to celebrate the biggest failure of the year by presenting the President's Intelligent Risk Taking Award. To win, one must identify the risk assumed and the steps taken to mitigate the risk—and one must have failed. The winner gets a trophy. Really, it's not the failure that's being honored, it's the willingness to take prudent risks in a risk-based world.

So, what simple management practices do you have that help define your culture and improve performance? Please send me your best practices at mfriedenberg@cio.com and I will make sure to share them with all of you in a future column.

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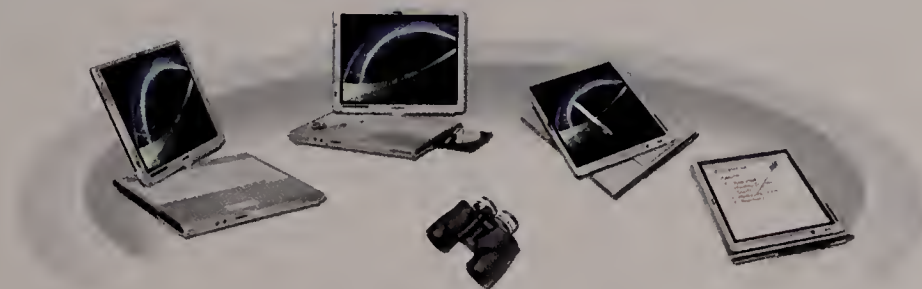
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trendlines

EDITED BY LAURIANNE McLAUGHLIN

NEW * HOT * UNEXPECTED

Mellon Fights ID Fraud

AUTHENTICATION Have you been asked to chime in to your company's version of "Who are you?" If not, you probably will soon, especially if you're in a services industry. More CIOs are facing the need to revamp authentication technologies, used to log employees or customers in to online systems. Authentication must maintain a delicate balance: It needs to be strong enough to keep crooks out but understandable enough for customers to complete successfully. One approach, knowledge-based authentication (KBA), is gaining popularity.

The basic premise of KBA is this: To log in, users answer a series of multiple-choice questions that are based on data from public records about

them—say relating to a real estate purchase—and are gathered by a third-party KBA provider.

For Mellon Investor Services (a subsidiary of Mellon Financial, providing shareholder services and related securities products to small- to Fortune 500-size firms), the move to KBA started with a longtime problem, says CTO Marc Librizzi. The firm had a large user population of individual shareholders, and no common data to help authenticate them.

A bottom-line business need drove Mellon to find a new authentication method that was workable: Every time someone chooses the call center instead of the website, it costs the company more

Continued on Page 16



Linux Users Shrug Off Microsoft Patent Threats

OPEN SOURCE Linux supporters are thumbing their collective noses at Microsoft's recent claim that it will seek royalties from users and distributors on 235 patents it holds for technologies in Linux and open-source software, saying they're not worried about patent infringement litigation.

The general consensus: Microsoft's threats of litigation—in recent statements Microsoft executives made to *Fortune* magazine—show that the software giant is afraid of the competitive threat that Linux and open-source software pose.

Joe Lindsay, CIO of mortgage company Secured Funding, says that Microsoft's attempt to cause fear, confusion and doubt may scare some users in the short term but will not stop open source's momentum. "It's like saying I have a big baseball bat, and I'm going to hit somebody," he says.

Linux distributors too were nonplussed, and Novell—which struck a licensing deal that included paying royalties on Linux to Microsoft last year—seemed annoyed. Horacio

Gutierrez, Microsoft's VP of intellectual property and licensing, compared the Novell deal as a model for how Microsoft wants to settle patent differences. However, Novell never admitted infringing on patents, a Novell blog pointed out.

Some suggest that the threat of patent litigation could be turned: There's as much potential patent infringement in Windows as in open source, says Jim Zemlin, executive director of the Linux Foundation, a nonprofit that promotes the OS.

"Microsoft is certainly not the only owner of patents in this area, and perhaps not even the owner of the largest number of patents in these areas," Zemlin says. (The Unix code on which Linux is based, of course, precedes Windows.)

Lindsay calls Microsoft's move a reaction to competitors like Google. "Their business model is fundamentally changing and Microsoft is using the courthouse to extend their old way of doing business," he says.

—Elizabeth Montalbano



The Ferrari of Videoconferencing

COMMUNICATIONS Think videoconferencing with muscle and you've got telepresence. This ultrahigh-end technology features HD, large plasma screens and fancy acoustics in a specially constructed room. Participants appear on the screen in life size and with zero latency, says Claire Schooley, a senior analyst at Forrester. Should this emerging technology be on your radar screen?

While telepresence may bridge the gap between meeting participants in a way that wasn't possible with traditional Web videoconferences, it's still cost-prohibitive for most companies. HP's telepresence solution, HP Halo, rings in at \$425,000. Cisco's Telepresence 3000 (a six-seat, three-screen telepresence room) and solutions from Teliris, Polycom and Tandberg each cost around \$300,000, Schooley says. Add on monthly fees for a concierge service to operate the meeting and room (sometimes offsite), and you see that this doesn't suit a small organization. However, it's effective for an executive who makes frequent trips among global offices. "Since these executives would use first class fares, in the long run it's more cost-effective to do telepresence," she says. In industries where visuals are critical, telepresence could also earn its keep, she adds.

An alternative: Upstart firm Telanetix is winning some attention for its approach. Customers can get started for \$1,000 a month on a financing plan, for a lower up-front investment. Telanetix says this makes its offering more attractive to midsize companies, as does the fact that its technology plugs into your existing meeting room, whereas the Cisco and HP products pose strict room and hardware rules.

Telepresence users are still relatively elite, but globalization and the increasing need for collaboration will drive demand, Schooley says, as will frustrations with overseas travel. Research firm Frost & Sullivan estimates that revenues in the North American telepresence market totaled \$27.6 million in 2006 and are likely to reach \$610.5 million in 2013.

—Katherine Walsh

Why Employees Misbehave

How can companies best promote ethical behavior by employees?
According to recent research, your first thought shouldn't be training.
It should be helping your staffers strike a good work-life balance:

16%
rank **ethics training**
as a positive
influence on
promoting
ethical behavior.

60%
say that job
dissatisfaction is a top
reason why people make
unethical work decisions.
**Compensation and
flexible work schedule**
are key factors leading to
satisfied employees.

91%
of employed adults
say that workers
will more likely
behave ethically
when they have a
**good work-life
balance.**

SOURCE: Harris Interactive

ID Fraud

Continued from Page 15

money. First, Mellon Investor Services tried a system in 2006 where shareholders logging in for the first time were sent an investor ID via postal mail, then went online to request an access code, which was sent in a second piece of postal mail. Volume to Mellon's related call center went up. "We needed to allow real-time access to our system," Librizzi says.

So Mellon rolled out a KBA solution from Verid in March 2007. Today, Mellon shareholders get the investor ID by postal mail, then visit the website to answer three multiple-choice questions. If successful, they can set up a PIN and use the system immediately if desired.

What are the questions like? According to Verid COO Chris Rickborn, the company uses data derived from public records, much of it from regulated records available to companies doing ID verification. Questions might include the color of your car, previous addresses, age range of a family member or date of purchase of a property, Rickborn says.

Among the aspects of KBA that Mellon likes, it doesn't maintain the repository of personal data as it would have to with hint-style systems, Librizzi says.

Why not choose an option like RSA-style security tokens? Tokens aren't a regulatory requirement, and dual-factor authentication "isn't realistic with a base of 18 million shareholders," Librizzi says, noting the potential for lost or broken tokens.

On the plus side, says Gartner VP and Research Director Avivah Litan, KBA doesn't require special hardware or client software, and it can be invoked at any time in the customer lifecycle. On the minus side, KBA questions and answers are subject to compromise, via guessing or stealing of data such as credit reports. She predicts next-generation KBA will be stronger but may involve consumer privacy concerns.

—Laurianne McLaughlin



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TIPS for Training Your Tech Vendors

MID-MARKET When you're a mid-market CIO, you may often feel like you're not receiving your vendors' full attention. After all, the big boys have more money to spend and more staff to help manage vendor relationships. Want to learn a few new tricks? Here are some tips from your peers,

traded at CIO's recent leadership conference:

1. Share the business plan.

"I am very much into collaboration and find sharing your future business plans often helps the vendor understand just what is at stake," says Sandy Rasel, VP, global process and applications management, McCormick & Company. "You are able to have

a much richer dialogue that supports your future direction and engages the vendor to work with you."

2. When negotiating, Web search first. You'll be amazed at the invoices and price data that you can find online when you search on a particular hardware part number or software package, says a mid-market CIO who

recently used this tactic when purchasing a WAN acceleration device and some high-end analysis software.

3. Show 'em the competition. "One of the best things we've done is a vendor appreciation day event," says Kevin Lupowitz, CIO for Liquidnet Holdings. Typically a golf outing and lobster dinner, this "builds great partnerships and individual loyalty. It also lets our vendors see who else we're working with, which helps maintain the sense of urgency to stay competitive."

4. Hire away one of the vendor's sales reps. Who's better to manage your relationship with that vendor than someone who knows the players and angles?

5. Play the Google card. Let vendors know that you're interested in Google Apps. Better still, consider banding together with other CIOs and presenting Google with requirements regarding Google Apps, says Ben Allegretti, former U.S. Marine Corps Systems Command CIO. "What if Google responded by building in added capabilities to meet our requirements? That just might change the entire dynamic of our relationships with some of our software suppliers," he says.

—Laurianne McLaughlin

TRENDLINES

How to Sell Your Staff on DASHBOARDS

MANAGEMENT TOOLS As dashboards—tools that show IT performance metrics and other measures in one graphics-rich window—become more widely deployed, you must position them well to your staff, says Gloria Campbell, associate professor of business administration at Wartburg College in Iowa. Selling them in the right way—especially to the midlevel and lower ranks—will help you utilize the tools effectively, without employees thinking you've channeled Orwell and gone "1984" on them. Her advice:

► **Let employees help set the metrics.** When employees help determine what a dashboard will measure, they're more likely to think it's a fair tool for measuring productivity and performance. "If people think the metrics are appropriately set, they're not going to feel as threatened," says Campbell.

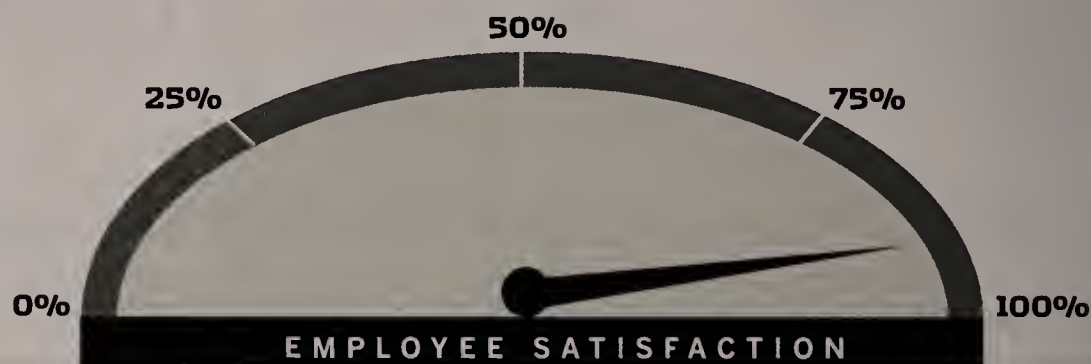
► **Stress the benefits of transparency.** Tell employees they'll see the type of data that years ago may have lived only in the office of the CFO. Employees can use the information to stay abreast of the company's performance. When something substantial happens to the business, they won't feel broadsided.

► **Explain the performance upside.** A boss who's using dashboards to track employee performance is not hiding a secret spreadsheet that tracks

this winners and losers, only to be revealed at the end of the quarter. "You not only know how you're doing, you know how your competitors are doing in other departments," Campbell says.

► **Show how dashboards can prevent problems.** Employees can be less reactive, and more proactive, when using dashboards—anticipating problems and solving them before the boss even has the chance to pick up the phone.

—C.G. Lynch





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Beating the BI Blues

BUSINESS INTELLIGENCE Many companies approach business intelligence from the wrong angle, leading to a lot of wasted effort by IT. In fact, companies spend more than 70 percent of the time, energy and money they dedicate to business intelligence on people and process issues, according to a recent Gartner study of BI accessibility. That's a costly sink, says Gartner analyst Betsy Burton. "The mistake a lot of executives make is trying to buy technology in the hopes that it will apply to the business objective," Burton says. "Companies should start any business intelligence effort by defining the business objective and then the people, metrics and processes that support those objectives."

What are the key obstacles that IT faces in constructing efficient BI systems? A lack of effective support from senior management really hurts. Yet of 350 global organizations Gartner surveyed, only 10 percent of BI and performance management efforts were sponsored by a C-level executive. Another problem: Many companies come at the BI issue wanting to "fix" or "clean up" the data. "Cleaning up data is not a business objective," Burton says. But that's how many IT executives drive their company's BI efforts, and as a result, the IT organization spends its time responding to tactical requirements, instead of driving business objectives.

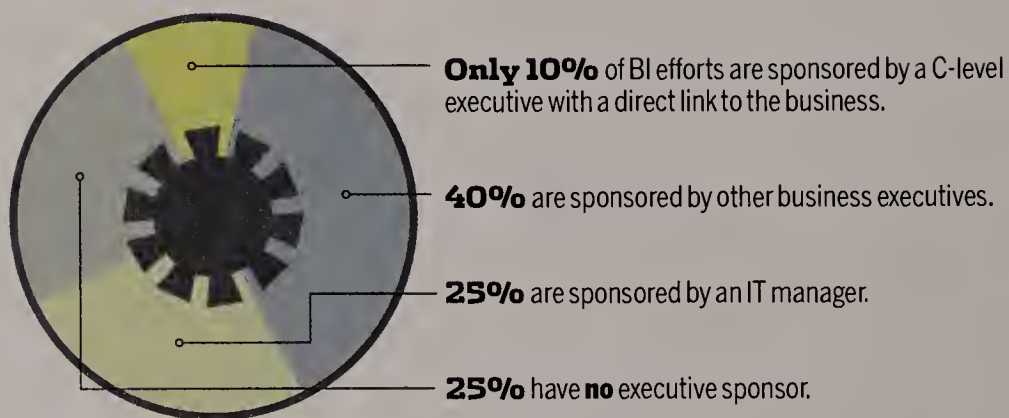
"It's important to have a team to bridge the divide" between IT and business expectations, she says. Companies that are ahead of the game have formed business intelligence competency centers (BICC) to help their organization master intelligence management, she says.

Smart BI planning will only grow in importance for CIOs. Most organizations are facing an information explosion but don't yet have a management strategy for it—and IT can sometimes be seen as the root of this problem, Burton says. Looking ahead, information management is one area where the CIO will be expected to act as a trusted adviser to the business.

Best Practices

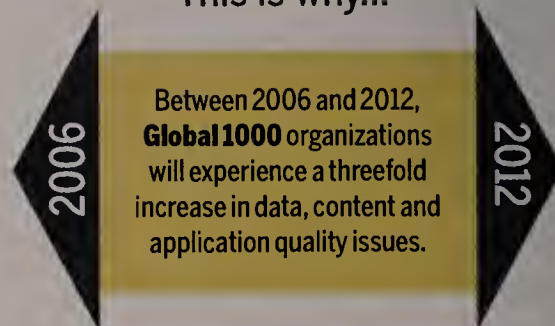
- 1 Get** an executive to sponsor your information management efforts. Consider the organizational structure, so you are able to adapt to changing business priorities.
- 2 Define** the objectives necessary to deliver the business strategy. Don't get mired in cleaning up the data. Construct your BI plan to improve on current processes, with an eye toward technology that plays into achieving the business objectives.
- 3 Compare** your plan with the current initiatives, tools and technologies. Your plan should strike a balance between strategic perspective and tactical requirements. It should be flexible enough to evolve over the next decade.

Where Are the BI Champions?



SOURCE: Gartner

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CIO EXECUTIVE VIEWPOINT

Integrated Virtualization: Transforming IT Infrastructures to Deliver More Value

Scott Crenshaw

Vice President, Enterprise Linux Line of Business, Red Hat

Scott Crenshaw holds P&L responsibility for Red Hat Enterprise Linux Platform, including the company's storage, security and client product lines. Previously, he was CEO of security technology vendor NTRU, and held several executive positions at enterprise software vendor Datawatch. Crenshaw received an MBA from the Massachusetts Institute of Technology and a BS in computer science from North Carolina State University.

The real promise of virtualization extends far beyond consolidation. "Delivered as a common platform for servers and storage, virtualization fundamentally transforms IT's ability to build a more flexible and responsive infrastructure," says Scott Crenshaw, vice president at Raleigh, N.C.-based Red Hat. Read on for more insight from Crenshaw on this hot topic.

How can virtualization unlock the real value of IT investments?

Virtualization makes IT more responsive, more flexible and more cost-effective. Consolidation is the poster child for good reason: Industry statistics show that average servers are utilized at only 15 to 20 percent, so there's a lot of wasted capacity. Virtualization enables better utilization to get more out of IT assets. Virtualization also offers higher availability, better response times and more agility, and it does all this while reducing costs—not increasing them. To fully unlock its potential, enterprises must deploy server and storage virtualization as a common platform.

"Virtualization makes IT more responsive, more flexible and more cost-effective."

What does integrated virtualization technology bring to the table?

The economies of buying and supporting virtualization as an add-on require business cases for every server. This effectively limits use to obvious purposes like server consolidation and testing. But that's just the tip of the iceberg. Through integration with the operating system, the economics of virtualization are being redefined, making once-impractical use cases possible. Now, virtualization can be used for high availability, disaster recovery and even capacity on demand. Integrated virtualization also yields better performance and much simpler deployment because all of the components come preassembled, pre-tested and preintegrated.

What are today's "must have" management capabilities?

For many, virtualization usage is still developing, so the management needs are fairly straightforward: the ability to provision machines, start and stop them, manage resource utilization, monitor performance, etc. However, as virtualization evolves, management requirements will grow substantially to include things like policy-based resource management and migration management, not just within the enterprise but to shared resources in the cloud. Most organizations need to develop a degree of expertise and comfort with virtualization, and maturity with some of the purchasing and political patterns associated with IT deployment, before they'll need these more advanced management capabilities.

What are some of the advantages of implementing Linux-based virtualization?

Linux is an appealing virtualization platform namely because it's known for the characteristics enterprises look for in product deployment: reliability, availability and security. In addition, the open source model means the quality and security characteristics of Linux are verified by literally millions of eyeballs, not just the QA resources of a single vendor. Enterprises need to know that their infrastructure is secure today and that it will remain so over time. That assurance can only be achieved by encouraging independent scrutiny on a very large scale.

What are the key elements of a great virtualization strategy?

First, deploy virtualization in a thoughtful manner, determining which areas can achieve the best performance, consolidation or availability gains, and putting some early wins on board. Second, build on a solid virtualization platform, one that has great reliability, availability and security, and that provides the economics for universal development. Third, as comfort builds, expand its



use beyond the initial applications, making virtualization the basis for an IT infrastructure that delivers better service, responsiveness, availability and economics. In short, start small and think big.

Where is Linux on the maturity scale as an enterprise-wide virtualization solution?

Driven by its performance, reliability and economic benefits, Linux is demonstrably the platform of choice for mission-critical, highly available applications, spanning from the core of the data center to the edge of the network. The beauty of the open source model is that customers have been participating in the evaluation of Linux-based virtualization for more than two years, so today's solutions reflect that field experience. And with open source, innovation occurs quickly. Customers can develop a very stable platform today and over time adopt new management tools that will substantially expand the benefits they can derive from virtualization.

For More Information: Check out this white paper, "Dynamic IT: Expand Your Capabilities With Red Hat Open Source," at www.cio.com/whitepapers/redhat.



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Edited by **Laurianne McLaughlin**
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Virtualized servers create power and hardware savings—and headaches, if you're not careful. Management tools can help automate oversight.

Thinking Inside the Boxes

BY KATHERINE WALSH

DATA CENTER | For Monster.com, the initial benefits of virtualization in the data center were easy to see: With 500 virtual machines (VMs) running on 17 servers, Monster cut power and hardware spending and improved efficiency, since virtual machines can be deployed much faster than standard hardware. But as Monster's virtual environment got big, and got big fast, management problems arose. The worst one: The company didn't have enough visibility into which applications were competing with each other across storage and server resources—and this was affecting IT's ability to meet service-level goals, says Pete King, manager of monitoring and analysis at Monster.

"We ran into a lot of contention," says King.

So King turned to BalancePoint, a workload balancing and applications service-level-management tool from startup Akorri, to ease the pain. BalancePoint shows when and why a particular VM is not performing up to standard, and based on that data, King can redistribute the load to increase efficiency. It analyzes performance on the VMware side and storage area network side to avoid virtual fights for resources.

Now that Monster has been using BalancePoint for a little more than a year, "there's less trial and error," says Paul Neilson, senior vice president of technology services. Monster no longer has to move VMs around based on "intuition," he adds.

Almost everyone using server virtualization will bump up against one or more of the common management problems, including workload balancing, "VM sprawl" and disaster recovery plan complications, says IDC analyst Stephen Elliot. Tools from VMware and a growing number of third-party vendors can help.

Keep Your Balance

Workload balancing can be a tough problem to get your arms around. One key benefit of virtual machines is the ability to move them easily from one physical server to another. Problem is, it's hard to know how many VMs on a particular server are too many—since the answer may depend on the applications, plus factors like memory and attached storage. In an environment where critical applications compete for the same server, it becomes difficult to see

ing servers to another machine) and Distributed Resource Scheduler (which couples with VMotion to allocate resources to high-priority VMs based on preestablished rules you set).

A key point: DRS and VMotion show where to balance workload, but they aren't analytical and don't see contention with other apps outside of VMware, King says. Since BalancePoint isn't tied to the OS, it can see if VMware performance is impacted by other apps residing on the same SAN resources, he says. "DRS just sees what it sees for performance through the host (CPU, memory and storage), but it can't see what the database server that's on the same side as the SAN is doing," says King.

The more VMs you move into production, the more critical predictability becomes, says Rick Knode, director of computing and communications infrastructure for San Diego Data Processing Corp. (SDDPC), a nonprofit provider of government IT solutions that serves customers like state agencies. Knode needed help managing resources in the company's current envi-

Monster didn't have enough visibility into which apps were competing across storage and virtual server resources: "We ran into a lot of contention."

—Pete King, manager of monitoring and analysis, Monster.com

which applications are contending with each other, and this affects a company's ability to prevent slowdowns.

For Monster, managing this challenge required multiple tools, a situation that's not uncommon. Monster uses Akorri's BalancePoint to augment the capabilities of VMware's two main management products, VMotion (which increases hardware utilization by migrating VMs on failing or underperform-

ronment (50 VMs on three servers) and in the future: Approximately 100 additional VMs will be added to production in the next fiscal year, Knode says. He looked to Vizioncore's esxCharter tool to obtain performance information on SDDPC's VMware ESX servers in real-time. This tool looks at performance levels and processes running inside the virtual machine. Being able to adjust the CPU power and memory allo-

Average utilization of an Intel-based server: less than 10%. Excess server capacity sitting around worldwide: **\$140 billion**

SOURCE: IDC

cated to VMs is critical when you need to make on-the-fly adjustments and terminate or move processes that are adversely affecting environments, Knode says. "It gives you more visibility into what's going on." For example, if a specific VM is eating away at one of his processors and affecting other VMs on that processor, he can use DRS and VMotion to move the VM onto another processor. But he says he wouldn't know which VMs to move without Vizioncore.

At Wachovia, the fourth largest bank in the United States, Tony Bishop, chief architect, turned to Scalent for help balancing workloads for his 1,000 VMs running on a few hundred servers used in development, testing and back-office roles. Scalent, which may be used independently or in concert with VMware, helps Bishop repurpose servers quickly. "Some of the other [management] tools we looked at also have forms of provisioning, but they don't have the ability to act in as near real-time as possible, like Scalent can," says Bishop. Scalent's software gives him management flexibility when apps are competing for resources, he says.



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in·spi·ra·tion (noun) Stimulation of the mind or emotions to a high level of feeling or activity — the condition of being so stimulated. An agency, such as a person or work of art, that moves the intellect or emotions or prompts action or invention. Something, such as a sudden creative act or idea, that is inspired.

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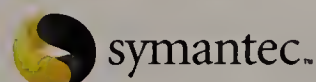
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Masters of Disaster

Flexibility also pays with regard to disaster recovery, an area where CIOs are increasingly looking to virtualization. Nate Stuyvesant, CTO of Genilogix, an IT consultancy, says disaster recovery is his company's biggest IT management issue, period. He's not alone.

According to Gartner data, 70 percent to 75 percent of Gartner's clients who are using virtualization for x86 servers are also using it for disaster recovery.

Genilogix runs 60 VMs on four servers across development, testing and production environments. Stuyvesant relies on VMotion to move a server over to another physical box and effectively eliminate downtime, VMware's DRS tool alone is a cogent reason to consider virtualization in the first place, he says.

Eric Miller, president and CEO of Genesis Multimedia, a Web hosting company that also designs its customers' Web applications, uses VMotion to increase uptime and improve reliability in his environment of 55 virtual machines running on three hosts, where some customers need higher utilization than others. Miller relies on VMotion, driven by DRS, to move the virtual machines around.

Genesis is no stranger to virtualization—it has been operating in a virtual server environment since VMware made its debut—but management isn't always easy. The initial move to consolidate 12 servers used for Web hosting, and two larger servers for database systems, helped Genesis manage its physical servers, but moving virtual machines around, implementing patches and performing BIOS upgrades without experiencing downtime was difficult, Miller says. As an infrastructure provider, Genesis must provide high service levels, so uptime is critical. "We

couldn't maintain those without VMotion and DRS," says Miller.

Add-on tools can help address the problem of "VM sprawl," by keeping track of how many VMs you have and where.

"It's somewhat ironic that the benefit of virtualization is resource optimization, but it encourages messy behavior," says Cameron Haight, a research vice president at Gartner, noting that almost all his clients cite VM sprawl as a big worry. "You can spend these things so quickly that you lose track of what you have," Haight says.

SDDPC's Knode says Vizioncore helps him prevent VM sprawl in the first place. "By watching the metrics of the virtual environment, we plan ahead. So by using VMware and Vizioncore I can see how many additional resources are available on an ESX host, and when is a good point to move machines or purchase additional servers or storage. We're using the product as a preventative measure."

Virtualization 3.0

Monster's King and Wachovia's Bishop both say they'd like virtualization management vendors to take the next step—better integration of their tools with existing management software. For example, King would like to see the tools in HP's Mercury Business Availability Center suite (which Monster uses for transaction and infrastructure monitoring) integrated with BalancePoint.

Bishop agrees: "We've achieved very good results, but we're trying to create an integrated management capability with all the tools in one view." Bishop, who uses HP's Mercury BAC suite, OpTier CoreFirst and Symantec i3, would like to see these tools better integrated with Scalent, VMware and DataSynapse, which he uses for application virtualization. After all, he says, virtualization tools can solve manageability issues, but CIOs want a holistic management picture. **CIO**

Reach Associate Staff Writer Katherine Walsh at kwash@cio.com. To comment on this article, go to www.cio.com/article/117256.

TOOLBOX

Virtual Success

VMware

VMotion and Distributed Resource Scheduler (DRS) are part of the VMware Infrastructure 3 suite's enterprise edition. DRS handles dynamic workload balancing, while VMotion migrates VMs across physical servers.

Scalent Systems

Scalent's Virtual Operating Environment (V/OE) tools, which may be used with or without VMware, maintain network and storage connections while moving servers. Scalent also redeploys servers in case of failure or load change.

Vizioncore

Vizioncore's esxCharter tool augments the capabilities of VMware, letting you compare the performance of individual VMs, spot bottlenecks and create long-term performance reports.

Akorri

Akorri's BalancePoint bridges the gap between server and storage components, providing insight into virtualized machines and the SAN, locating points of contention and providing troubleshooting analysis.

You'll find about 50 other vendors tackling virtualization management, says Cameron Haight, a research VP at Gartner, including: Platespin (disaster recovery and migration); Aurema (recently acquired by Citrix, VMware resource management); Cirba (data center consolidation planning); BMC (capacity planning); and CA (performance monitoring across multiple infrastructures, including VMware, Sun and AIX).

—K.W.

Virtual Tutorial

For more background and tips on doing virtualization right, see **ABC: AN INTRODUCTION TO VIRTUALIZATION**, www.cio.com/article/40701.

CIO.com



IP COMMUNICATIONS ON THE BRAIN

IDG RESEARCH SHOWS TANGIBLE BENEFITS ARE PUSHING VOIP ADOPTION INTO THE MAINSTREAM

"Technology adoption nirvana occurs when a core need drives both the business and IT organizations," says Joseph Staples, senior vice president of world-wide marketing at Indianapolis, IN-based Interactive Intelligence, Inc. "IP communications exemplifies this phenomenon."

But are enterprises really on board for widespread adoption?

In a recent survey, IDG Research Services asked senior IT and corporate management leaders from a cross-section of industries—including financial services, healthcare, government, high-tech, manufacturing and more—just that. Their answer: a resounding "yes." Despite some lingering market perceptions, IP communications is a mature technology in the midst of broad adoption—primarily due to the many tangible benefits for both IT and business leaders.

Read on to learn more about survey results.

IP PBXs ARE IN THE MAINSTREAM

Some 63 percent of respondents indicate they will have IP PBXs installed within 12 months, up from 50 percent who have the technology today. Additionally, hosted Voice-over-IP (VoIP) use will grow from 23 percent to 30 percent in the coming months.

CIOs are migrating to IP communications for access to more advanced telephony-based applications, help in managing

distributed business environments and, of course, the promise of significant cost savings.

"But what's truly fascinating is the 'follower mentality' that's at play here," says Staples. "Some enterprises will implement VoIP simply because it's the thing to do." A spot-on decision, albeit undefined.

Of those burgeoning applications for IP telephony, respondents expect an increase in unified messaging deployments from 30 percent to 49 percent in the next 12 months. Unified messaging is the long-heralded "killer app" that, thanks to VoIP, may finally be taking hold.

Speech recognition is also anticipated to grow significantly, largely because it's now more affordable and reliable. Similarly, presence management is slotted for expansion as its use continues to extend beyond the contact center.

Respondents point to videoconferencing, unified messaging, audioconferencing and remote/teleworker solutions as top priorities for future investments in IP communication solutions.

BUSINESS IMPERATIVES ARE DRIVING INVESTMENTS

Perhaps most intriguing: Business needs are driving investments in IP communications. Respondents' primary reasons include the need for more connectedness, the increase in mobile employees, the desire for increased productivity and user demand for current technology.

"Business managers are pushing for VoIP implementations and applications because being unconnected during a layover at the airport simply doesn't cut it anymore," says Staples.

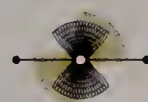
But IT is on board too as VoIP technology is seen as an effective method to ease deployments, eliminate the need for separate communication paths, and ensure employees have the same communication experience regardless of location.

Product performance (74 percent) and security (63 percent) are top-rated criteria in the selection process.

Roughly one-half of respondents rate their current vendors as "excellent" or "very good" in terms of delivering on performance and security. Yet, average vendor performance vs. average importance is surprisingly low for such important items.

"This gap is created by lesser-known, less-experienced IP telephony vendors," concludes Staples. "If you carve out solutions from the top 10 vendors, that gap would narrow quickly."

Investment in IP communications isn't a matter of *if*, but rather *when*. Go to www.cio.com/whitepapers/inin now to obtain a free download of the full survey results with enlightening commentary from key respondents.



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Business needs are driving investments in IP communications.

Nothing Ventured, Nothing Gained

How working with VCs can help your career take off



As you flip through the pages of your Rolodex (or more likely, your Outlook database), some standard categories of contacts will regularly appear: past colleagues, former bosses, executive recruiters, vendors and the like. Now look again: If “venture capitalists” does not appear as one of your primary networking groups, you are missing out on what could be a major catalyst for your career.

VCs frequently ask me to introduce them to my network of CIOs, and it’s easy to understand why. CIOs have much to offer a VC in need of customer feedback on the product potential of their portfolio companies.

“Most VC firms, particularly those who invest in enterprise technology companies, have an interest in engaging with CIOs,” says Peter Solvik, former CIO of Cisco Systems and now managing director at Sigma Partners. “CIOs can be very valuable in helping a VC firm evaluate a particular investment. The hands-on experience a CIO has had allows him or her to ask different questions than a VC might.”

What a CIO has to gain from the relationship can be a bit harder to pin down. But in conversations with both CIOs and VCs about this, there is consensus that such arrangements are a two-way street. For the CIO, they say, there are four significant benefits.

1. Learning About the Technology Landscape

While it is true that most of today’s CIOs eschew the straight technology role in favor of business leadership, technology knowledge is still a CIO’s primary differentiator. Knowing which technologies are on the horizon remains critical to your role, regardless



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of your reach into the business.

"Successful CIOs are always looking at how they can apply technology to advance their company," says Asheem Chandna, partner at VC firm Greylock Partners.

"The best VCs are familiar with the technology landscape and the business value these technologies can deliver. For the CIO, a key benefit to working with VCs is the window they offer into emerging technology," says Chandna.

2. Gaining Board of Directors Experience

For any CIO who is looking to secure a CEO position someday, experience on a board of directors is a critical item on your résumé. But that first board position can be extremely challenging to obtain. The CIO-VC connection provides one route toward landing your first role.

"Start on an advisory board," suggests Solvik. "If the VCs and the company's management team see that you have strategic insight into the company and can help on positioning and execution, they may extend your role to the board of directors."

3. Getting Access to Potential Startup GM Roles

While IT startups should be the perfect environment for CIOs to move into their first general management role, startups

themselves typically do not see it that way. The companies usually have a technology expert on board already—the entrepreneur (usually the CTO) who came up

with the idea in the first place. Instead, they are looking for execs with experience in sales, finance and marketing. They often see CIOs as risk averse and as possessing experience running large, complex organizations, not sprightly product development teams. Here is where your VC contacts can be highly effective.

"When we hire members of senior management teams in our small growth companies, in addition to a demonstrated track record in the functional area and relevant market knowledge, we look for critical personal attributes like integrity, intellect, passion and the ability to execute," says Chandna.

If you approach your board activities as a long interview process for a GM role in a technology startup, you have ample opportunity to demonstrate these personal attributes and compensate for the fact that you have never led a sales organization.

Chris McDaniel is a case in point. McDaniel was CIO of Mutual Service, a securities brokerage, for more than five years. When Blue Frog Solutions, a startup technology pro-

vider to the securities market, opened a search for a COO, McDaniel was an attractive candidate. McDaniel had met with Blue Frog as a prospective customer, and he knew the company from the market perspective. More important, he had already established a relationship with Pershing, Blue Frog's primary investor.

"While I was at Mutual Service, I served on the technology

If "venture capitalists" does not appear as one of your primary networking groups, you are missing out on what could be a major catalyst for your career.

board for the National Association of Securities Dealers, where Pershing had representatives. Talking with the Pershing people about hot-button issues in our industry really helped me to cultivate those relationships," he says. It also allowed Blue Frog's investors to see McDaniel as an industry player and as Blue Frog's COO.

4. Test-Driving a VC Career

Oh, to lead the life of a successful venture capitalist. You wake up, work out, put on a designer suit, slip into some sort of Italian sports car, drive to your office and spend the rest of the day listening to cutting-edge business ideas from today's most brilliant entrepreneurs. No firefighting, no project management, no users.

It is no wonder that more and more CIOs are telling me they would like their next job to be as a VC. However, if you've achieved success as a CIO, you might possess exactly the wrong attributes for the job.

"CIOs interested in pursuing a VC role should do a gut check," says Solvik, since CIOs are often paid to be risk averse and spend money only on established technologies.

"It probably only makes sense if you are more of a futurist than a mainstream adopter," he says. "If you have built your career on being conservative rather than bleeding edge, the VC role might not be the right one for you."

Working directly with venture capitalists will give you a much closer look at whether this particular career path belongs in your future and the contacts to make it happen, if you decide that it does. **CIO**

Martha Heller is managing director of the IT Leadership Practice at ZRG, an executive recruiting firm based in Boston. Reach her at mheller@zrgroup.com.



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Your Plan to Fight

CYBER

BY CHRISTOPHER KOCH

Online crime is organized, its perpetrators attack deliberately, and the likelihood that they will attack your company—and even shut it down—is growing. Here's how to mitigate that risk.

Kevin Dougherty has seen his share of spam and phishing scams,

as has any IT leader in the financial services industry. But the sender's name on this particular e-mail sent a shudder down his spine: It was from one of his board members at the Central Florida Educators' Federal Credit Union (CFEFCU).

The e-mail claimed in convincing detail that there was a problem with the migration to a new Visa credit card that the board member was promoting to the credit union's customers. The fraudulent message urged customers to click on a link—to a phony website set up by criminals—and enter their account information to fix the problem.

But what happened later that Friday afternoon—after Dougherty, who is senior vice president of IT and marketing, had wiped the credit card migration information off the website and put up an alert warning customers of the scam—really scared him. Around 2 p.m., the site suddenly went dark, like someone had hit it with a baseball bat.

That's when Dougherty realized that he was dealing with something he hadn't seen before. And he couldn't describe it with conventional terms like phishing or spamming. This was an organized criminal conspiracy targeting his bank. "This wasn't random," he says. "They saw what we were doing with the credit card and came at us hard."

Dougherty's website lay in a coma from a devastating distributed denial-of-service (DDoS) attack that, at its peak, shot more than 600,000 packets per second of bogus

Reader ROI

- :: Ways cybercriminals are becoming more sophisticated
- :: Steps companies can take to combat the threat
- :: How CIOs can gain top-level business support for security investments

CRIME

After a cyberattack disabled the website of the Central Florida Educators' Federal Credit Union, Senior VP of IT and Marketing **Kevin Dougherty** convinced his CEO and board to consider security as a critical business issue.



service requests at his servers from a coordinated firing squad of compromised computers around the globe. That the criminals had the skill and foresight to launch a two-pronged attack against Dougherty and his customers was a clear indication of how far online crime, which is now a \$2.8 billion business according to research company Gartner, has come in the past few years.

Though this dark business largely targets financial services companies, there are signs that criminals are beginning to covet new victims. Since January, phishers have been documented going after "many types of websites not typically targeted," such as social networking and gambling sites, according to the Anti-Phishing Working Group, a research group.

As cybercrime enters this second wave, criminals with no programming experience can buy illegal packaged software to carry out sophisticated attacks, and information security can no longer be addressed merely with a firewall. It has become not just an IT risk, but a business risk. The threat extends beyond systems, affecting everything from marketing and the customer relationship to government compliance, insurance costs and legal liability. Beyond IT and a trusted cadre of security vendors and consultants, information security requires understanding, involvement and consensus from all parts of the business at all levels, right up to the board, before problems occur. Security to combat cybercrime needs to be part of a company's disaster and business continuity plans, with security spending based on the overall threat cybercrime poses.

If security is viewed simply as an IT cost and responsibility, companies will never be truly ready for the risks they face. "If you do have an attack, it's never just the data that you lose or the customers who are victimized, it's [also] the larger effects that the attack has on everything else," says Ian Patterson, CIO at online brokerage Scottrade. "It's the marketing effects, the customer service effects, the business effects."

How Cybercrime Is Changing

The crooks are still after the money, but they are developing more sophisticated ways of getting at it. They're willing to hang around

WHO YOU GONNA CALL?

When cybercriminals strike, law enforcement agencies are often overwhelmed. So CIOs are looking elsewhere for help.

When the website of the Central Florida Educators' Federal Credit Union was attacked by phishers last August, CIO and VP of Marketing Kevin Dougherty's first instinct wasn't to call the police. Though he did eventually contact the FBI, "unless you can say you were hit with some very large dollar amounts I don't think they have enough people to deal with this," he says.

And so CIOs like Dougherty are assembling crime-fighting coalitions from among consultants, vendors and telecom providers. There's a historical parallel, says Peter Cassidy, secretary general of the Anti-Phishing Working Group. When banks opened up 150 years ago, there wasn't an FBI, "so banks hired private law enforcement like the Pinkertons," he says. One day there will be routine cyber-investigations, "but for now we are still in the Wild West."

Law enforcement faces several challenges. First is the nature of cybercrime: global and independent of geography. Hackers in Russia can steal money from a bank in the United States using a computer in France quickly, cheaply and with no human intervention required. And their fingerprints—the IP addresses of the computers that initiate the attacks—can be made to disappear before investigators can track them, according to Ron Plesco, director of the Privacy and Special Projects Group for consultancy SRA International. Internet service providers keep logs of every connection but can't afford to hang on to the piles of data for more than a few days without overwhelming their storage systems.

There's also a shortage of computer expertise among the FBI and Secret Service, which investigate cybercrime, and the U.S. Department of Justice, which prosecutes it. Given the manpower shortages, investigators need to limit themselves to cases with big losses. Unfortunately, the majority of cybercrimes are committed by small operators, says Uriel Maimon, senior researcher in the Office of the CTO of security provider RSA. "There aren't many \$250,000 frauds," he says, but there are a lot of \$2,000 cases—a big-enough haul for a criminal in an impoverished country.

Finally, there is the complexity of fighting crime across different countries, many of which lack laws that specifically target cybercriminals. Experts speculate that we could someday see the rise of a new global organization specifically targeted at cybercrime, much as the FBI was created to take on the automobile-fueled rise of interstate crime in the 1920s and '30s. Painter is skeptical. "What we need to do is connect the dots rather than create a new über-organization," he says. Painter chairs a G8 committee that has agreements with 48 countries, which have identified cyber-investigators whom they make available to the network 24/7, he says.

—C.K.

longer and in places where the money isn't immediately available. For example, the breach disclosed earlier this year at retailer TJX unfolded during more than a year, as criminals accessed the system multiple times to extract customer credit card numbers, using technology that has, "to date, made it impossible for us to determine the contents of most of the files we believe were stolen in 2006," according to TJX's annual report filed with the Securities and Exchange

Commission. (For a possible way the TJX breach was accomplished, see "Interview with a Mob CIO," Page 43.) "The new paradigm is to not make big, noisy attacks," says Chris Painter, principal deputy chief of the Computer Crime and Intellectual Property Division at the U.S. Department of Justice.

Phishing attacks increasingly use subtle ways of gleaning information that are not apparent to even the most educated computer users. As the sophistication of the

CIO2CIO 2 PERSPECTIVES

Today's IT Leaders on Market Trends

SOA *and* OPERATIONAL READINESS

CIOs Address Challenges, Best Practices in SOA Deployment

Making sure a company is ready to deploy service-oriented architecture (SOA) is a complex task. And, according to a recent survey, CIOs approach it much as they did reengineering—as a project that will ultimately effect technical change as well as organizational and process evolution.

“Organizational changes are critical to SOA migration,” says Yves Meyer, head of the project management office and architecture at IXIS, a financial services firm based in Paris. “It causes changes to and within the organization.”

The survey, conducted by IDG Research Services, asked CIOs at midsize and large enterprises about best practices surrounding SOA deployments. In lengthy discussions, the respondents cite organizational changes and the need for IT to obtain business buy-in. At the same time, CIOs expect to see some significant role changes within the IT department. Here's how they look at it.

Selling to the Business

Survey respondents note several challenges that must be addressed in order to ready a company for SOA deployment. Specifically, respondents cite the difficulty of getting business units to look at enterprise (rather than their own) goals. Among the obstacles:

Information ownership. Both line-of-business and IT staffers can be territorial about the information that drives business processes, and resolving ownership issues is a politically-charged

process. “Within the organization, there's going to have to be a culture change to allow more access to individual departments' data,” says Rick Allen, assistant vice president of operations and service line director at Georgia-based Gwinnett Health Systems. “You can't have an area like cardiology or

radiology saying, “This is my data. Nobody else can get into it.”

Resistance to change.

Mapping business processes that work on an enterprise-wide level requires that business sponsors and CIOs sign off on a common view. However, getting users to abandon function-specific biases remains a significant

issue. “This is a major challenge—we have 25 business units, and each of them does things differently,” says Meyer. “Getting them to let us take a look at how they do things and help them figure out areas of improvement is going to be tough.”

Selling SOA-related change to the business.

Respondents note that education and training are vital to selling the benefits of SOA. “I think the training and understanding are key, and it's a slow process,” says the CIO of a utility.

SOA Governance

SOA initiatives require governance on technical and non-technical levels. With SOA, applications are composed of services built with different technologies that run on different machines. This distribution and heterogeneity make deployment and management challenging. Capabilities and



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functions such as security, auditing and logging, maintaining uptime and meeting service-level agreements are performed differently on each platform, and are often hard-coded. This results in more development work, and it also often provides less control in managing the services as part of composite applications, an inability to guarantee levels of security or performance, and more work whenever changes must be implemented across applications.

CIOs must also devise workable ways to ensure that departments use processes and services originating in other departments. As service use becomes more intertwined, knotty issues of ownership arise. For example, CIOs must

consider: Who owns each service? Who pays for service creation and maintenance? Who has the right to change a service, particularly if the change affects other service users?

Companies approach technical and non-technical issues of governance in different ways. "We have an architecture group, which is also the governance group," says Larry Krieb, vice president of the IT global information services group at Estée Lauder in New York City. "Nothing goes into production without code review by the SOA architecture group."

Some organizations address the situation by forming an SOA Center of Excellence, where enterprise-level architects with SOA expertise oversee service management on an enterprise-wide basis.

Respondents also mention other governance methods, such as a program management office and a cross-division group to create and manage SOA standards.

Changing IT Roles

Many CIOs say that a key part of being prepared for SOA means rethinking how the IT group develops applications or services. In particular, the

role of the IT architect has taken on increased importance, with new tasks ranging from long-term strategy and planning to SOA governance. "Architects are like a lynchpin for making everything happen," says Krieb.

At the same time, developer roles change as they acquire new skill sets to reuse services that have been created across the enterprise. "Developers will now have to think enterprise-wide," says Meyer. "Individual requests will have to become enterprise requests, so to speak, so that the capability can be reused across the organization and shared by other groups. This is a big shift."

Measuring SOA Success

Many respondents are in relatively early pilot stages of SOA and

hence speak about projected measurements rather than actual practices. But CIOs commonly note that they expect SOA to help them do things faster, both in terms of business and IT development, and that metrics will reflect that promise.

"We will probably develop some ratios between the volumes of activity performed and the staff that is required to handle the work," says Meyer. "Those are two numbers that would be easy for us to get."

Other respondents cite as projected metrics the ability to get information that was previously unobtainable, increased efficiency and budget and SLA adherence.

Preparing a company for SOA deployment consists of far more than technology implementation. CIOs say that addressing process change and managing expectations on the business side are critical to ultimate SOA success, and many have turned to outside consultative help to address this complex organizational challenge. ■

"Nothing goes into production without code review by the SOA architecture group."

LARRY KRIEB
VP, ESTÉE LAUDER

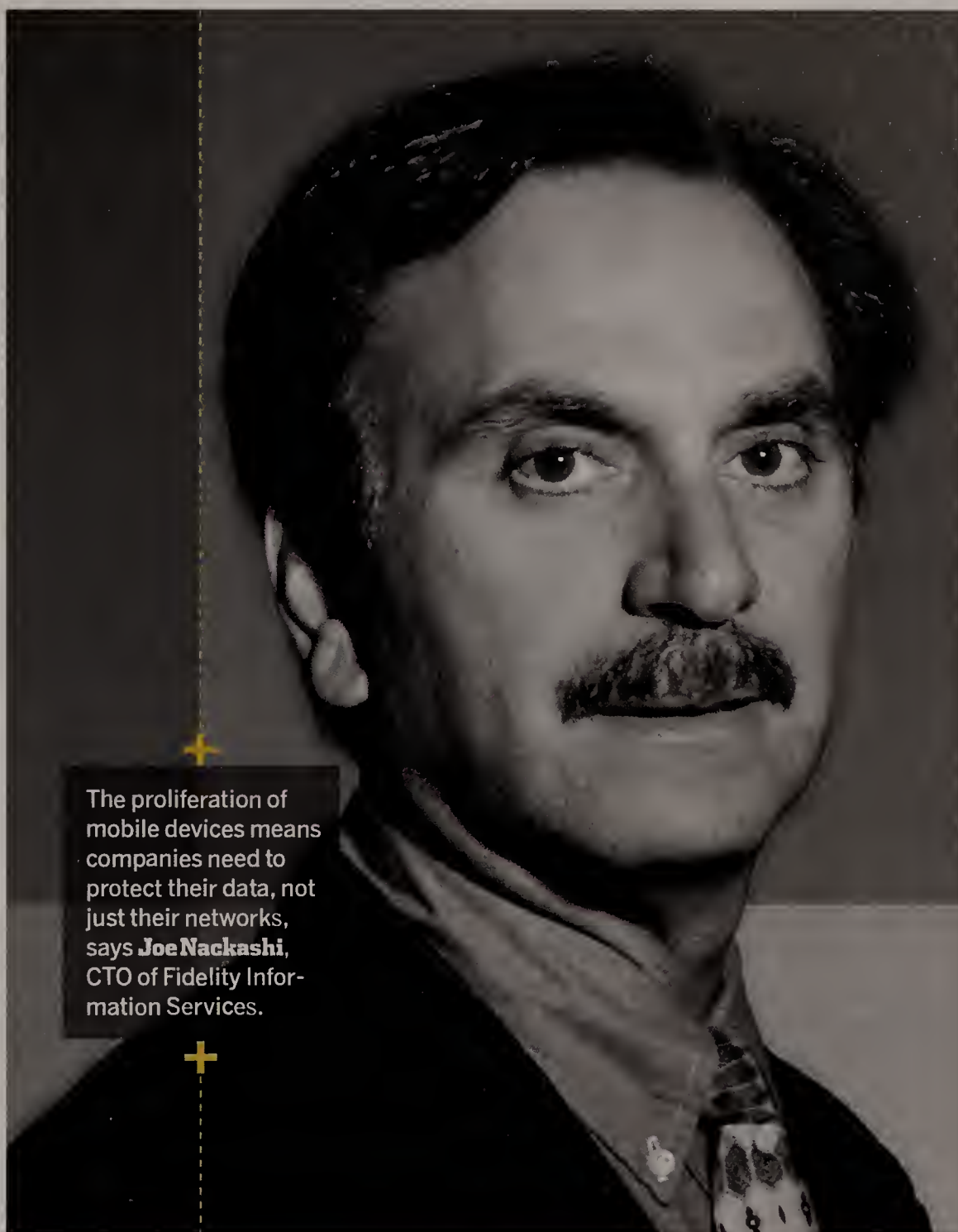
Go to www.cio.com/whitepapers/readiness now to obtain a free download of "Executives Warn: SOA Demands More Than Just Technical Change". Based on a major research survey by IDG Research Services featuring in-depth discussions with CIOs at midsize and enterprise class organizations, this just-released white paper will help CIOs analyze their SOA model in accordance with the challenges and best practices reported in the paper. By doing so, they will have a powerful tool to create and manage enterprise wide SOA frameworks.

attacks continues to improve, the percentage of consumers who click where they shouldn't has risen from 18.6 percent in 2004 to 24.9 percent last year, according to Gartner. Online crime "will spread from financial services as the use of indirect attacking grows," says Markus Jakobsson, a security consultant and associate professor of informatics at Indiana University. "For example, perhaps you go to a funny cartoon website where it asks for information that mimics what's needed to impersonate you on eBay."

That threat is mounting every day. The number of people who believe or know they received phishing attacks doubled between 2004 and 2006, from 57 million to 109 million, according to Gartner. Although fewer victims are losing money, the losses per victim have more than quadrupled since 2005 and the percentage of that money recovered has dropped from 80 percent in 2005 to 54 percent in 2006. Even if victims don't lose money, there is a cost. The Federal Trade Commission estimates that it takes consumers an average of 30 to 60 hours to clean up a credit history damaged by identity theft.

For businesses, the unseen costs are even higher. For 56 organizations studied by the Ponemon Institute that experienced the loss or theft of customers' personal data, the loss of business resulting from the breach eclipsed by nearly \$400,000 the combined cost of detecting an attack, notifying customers and helping them work through any resulting problems (on average, \$128 per compromised record and \$2.6 million in total).

Meanwhile, the administrative savings that make the online channel so attractive for businesses are being eaten up by consumer fear and avoidance. A recent Gartner survey found that 23 percent of online banking consumers have fled the channel because of security concerns. Nearly 24 million people won't even consider online banking because of them. "That means you have people doing transactions at the bank that cost \$15 each when they could be doing it online for pennies," says Tim Renshaw, vice president of product solutions for TriCipher, a security software company. In addition, plummeting trust in e-mail has made it a dicey customer communications vehicle. More than 85 per-



The proliferation of mobile devices means companies need to protect their data, not just their networks, says **Joe Nackashi**, CTO of Fidelity Information Services.

cent of respondents to the Gartner survey said they delete suspect e-mail without opening it. Dougherty says CFEFCU has abandoned e-mail altogether. "We have had to go back to snail mail," he says, noting that it's about 90 percent more expensive and much slower and less flexible than e-mail.

What Happens When You're Unprepared

Dougherty faced these broad risks on that awful Friday afternoon last August, when a criminal website intent on stealing the identities of Dougherty's members was his only operating face to the world on the Web.

Obviously, the first thing Dougherty had to do was stop the attack. He had to hurriedly assemble a coalition of vendors

and consultants to help him, and then he had to convince his CEO that drastic steps were needed—steps that would temporarily cut off customers from any possibility of getting to their accounts online until the problems were completely eradicated. (To find out why companies rely more on vendors than on law enforcement for help, see "Who You Gonna Call?" Page 36.)

Dougherty wanted to have the site temporarily blacklisted with his telecom provider, BellSouth, to deflect the attack, thereby reducing pressure on the site and giving him the time and flexibility to make protective changes. But his CEO resisted—as might anyone who has not experienced an attack. "He wanted to keep it up so we could service the members," says Dougherty.

At 11 p.m., after a long night of battling the attackers and plotting strategy, Dougherty finally convinced his CEO to have the site blacklisted and to take a break until morning. Continuing in a tired and emotional state would have played into the attackers' hands. "It's a mind game," says Dougherty.

By Saturday morning, Dougherty had RSA, a security vendor he called in when the attacks began, working to set up a "take-down" service that seeks out and dispatches criminal websites (in this case, more than 30) with its own cyber baseball bat. Meanwhile, BellSouth began beefing up security around the credit union site to try to thwart attacks. Dougherty also began planning with RSA to build multifactor authentication into the website. As these solutions emerged, the CEO became comfortable with Dougherty's blacklist-ing decision. "We built heightened awareness with the board and the executive management team," says Dougherty. The site was back up by Saturday evening. In the end, 22 customers gave up their information to the thieves and the total losses were "less than five figures," says Dougherty. (To learn why it's hard to prevent customers from falling for phishing scams, see "Stop Them Before They Click Again," Page 40.) Though the credit union had averted disaster, "it was a rude awakening," he says.

Firewalls Aren't Enough

Dougherty also woke up to the fact that he needed to communicate more with his executives and the board about IT security and its link with the bank's risk and security strategies. Now he scans banking conference agendas for security content and encourages his executives and board members to attend. Sometimes he accompanies them. "I was with our chairman at a conference and there was a security presentation and so I said, Why don't you

come down and we'll go to this together? Then, when he had questions, I was there to answer them. Sometimes the technology scares them and you have to get them comfortable with it."

Every month, Dougherty also sends three or four security articles to executives and the board that he encourages them to

"We lost some of our branches in Hurricane Katrina. If you have a DDoS, you have to do some of the same things to respond. You have to reroute people and phones and make sure the communications about the situation are clear and concise."

—Ian Patterson, CIO, Scottrade

read. He has subscribed to a fraud intelligence information service from RSA that gives updates on the latest threats and suggested responses, and he passes that information along too. "It's vital to have data to relay to my management team," he says.

Dougherty is also in charge of all training for employees and has broadened that educational effort to include security. He now demands that at least one security article go in each edition of the bank's quarterly newsletter.

He doesn't think he has a choice because the auditors have become tougher. In the wake of the attack, the bank strengthened its audits that tested for vulnerabilities, both online and off. One of those tests inside branches found that crooks didn't need the Internet to gain access to data. "We had guys sling monitors over their backs and tell the tellers they needed to fix the computers. They got past our tellers in three branches," Dougherty sighs. "But I would rather have the auditors find these

things than someone else."

With so much at stake, however, CIOs have to move beyond such traditional defensive strategies. They need a protection strategy for the data too. The threat of security breaches by rogue employees or contractors has always been higher than the threat from criminals outside. But now the outsider threat is increased due to the greater portability of data via mobile devices, says Joe Nackashi, CTO of Fidelity Information Services, which hosts data not just for Fidelity but for other financial services companies as well.

In 2004, Fidelity began encrypting all of its financial data, not just on its internal systems, but on any device that enters or exits the data center, including laptops, thumb drives and magnetic tapes for mainframes. This way, "even if you lose the data, it will be scrambled when someone tries to recover it," says Nackashi.

But encryption is expensive (because of the effort involved to dress data in extra scrambling code) and complex, requiring processes for deciding what to encrypt when, where, why and by whom. Furthermore, encryption is only as strong as its weakest link. If business partners and contractors don't follow the same processes and use the same encryption methods, all that scrambling is for naught. These difficulties probably account for why only 16 percent of organizations surveyed by the Ponemon Institute said they had an enterprisewide encryption strategy.

Yet more companies, including those outside of financial services, will need to consider encryption for their most sensitive data. The growth in mobile devices and the ability of employees to install and run their own software gives data legs to run around the firewall—what Nackashi calls "data in flight."

Though Nackashi won't say how much Fidelity spends on its encryption effort, it is evident in the amount of management time he has devoted to it. "Two years ago, it probably consumed 100 percent of my time because we were planning the strategy," he says. "Today we're in implementation mode, so it is probably 30 percent." This despite the fact that Fidelity has a full-time chief information security officer

How Cybercrime Evolved

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who is Nackashi's peer. Overall, Fidelity's security staff has grown 30 percent over the past two years, he estimates. "This isn't something you can compromise on from our perspective," he says. "The nature of the business we operate in leaves us no luxury to play fast follower."

Get C-Level Buy-In

Such dramatic increases in security staffing and spending are a barometer of cybercrime's evolution from IT nuisance to business risk. Scottrade's Patterson has quadrupled his security staff from two to eight since 2004, and he estimates it will more than double next year.

Anyone who resists this growth in security spending needs to consider the bigger picture, says Patterson. "What if a breach among a small number of customers caused us to lose 170,000 or 300,000 customers overall, what would be the business ramifications of that? Everyone has to be in agreement that whatever that number is, you build your ROI from that."

As a way to give information security the billing it deserves, Patterson has pushed Scottrade to link it with the company's disaster recovery and business continuity strategies. "We lost some of our branches in [Hurricane] Katrina," says Patterson. "If you have a DDoS attack you have to do some of the same things. You have to reroute people and phones and make sure the communications about the situation are clear and concise." Meanwhile, at CFEFCU, Dougherty has consultants to do a data breach business impact analysis that links to the organization's disaster recovery strategies.

But CIOs can't be left as the sole advocates of a broader risk strategy, or it will never happen. Executive committees and boards have to be involved in the decision making. "I put up a picture of the Kremlin when I present to the executive committee. Whatever it takes," laughs Scottrade's Patterson. The picture is a reference to Russia as a hotbed of cybercrime. "The business has to be just as aware of this as I am."

One way he builds awareness is to present a set of security key performance indicators to his executive committee every month. For example, he gives an overall report on internal and external vulnerabilities by

STOP THEM BEFORE THEY CLICK AGAIN

Educating users won't prevent them from giving up info to fraudsters. Take them out of the loop.

You may need to wait a minute for another sucker to be born, but you can find one anytime you want online.

In a recent MIT-Harvard study to determine online gullibility, 36 percent of test subjects logged in to their online bank accounts despite being presented with a strong warning page saying that their bank site's security certificate was not valid. Not one person noticed when HTTPS, the secure form of HTTP, was stripped away—they offered up their passwords anyway.

Although our instincts tell us that better education might have saved these users from themselves, there is a growing consensus among researchers that education will never stop many people from clicking when they shouldn't. The problem, says Markus Jakobsson, a security consultant and associate professor of informatics at Indiana University, is one of focus. "When people go online, they are focused on other things besides security," he says. "They want to pay their bills online or talk to their friends. People don't pay attention to security clues online." Even when, as in the MIT-Harvard study, they are reminded to pay attention to warnings.

Meanwhile, the kind of information that lulls victims into a false sense of security is still widely available online. In a 2005 study, Jakobsson was easily able to find the Social Security numbers and mothers' maiden names of millions of Texans online. "When the e-mail comes with your mother's maiden name already in there, it's a lot easier to click," he says.

So what to do? Some suggest issuing new passwords through small electronic fobs called tokens each time someone logs in to a site, or requiring account holders to verify withdrawals via a cell phone call. But both solutions are costly, complex and potentially inconvenient to customers. The best answer may be to relieve home computer users of responsibility for computer security.

Already, some ISPs are offering security software as part of their subscription pricing, judging that the extra cost is more than balanced out by reducing the risks they face from the pipe-clogging spam and malware. With 2.4 million unsecured broadband connections in the United States today, according to *Consumer Reports*, it may be time for the IT industry to face that consumers will never close the security gap by themselves. To the extent that end-user companies could be liable for their customers' inaction, they need to weigh the risk of leaving the responsibility for managing security in the hands of customers who may never do it adequately.

—C.K.

tracking intrusion alerts and monitoring the security patching efforts, broken down by data center and hardware at Scottrade's corporate facilities as well as at its branches. Eighteen months ago, he says, "we were not tracking this information."

Dougherty's CEO and board now also are vested in security as a critical business metric. Perhaps the best evidence of this was when his site was attacked again later in the summer.

The attack was neutralized within a few hours, says Dougherty, because of the new strategies he had in place, but also because there was no need to argue any of them with the CEO or the board. "They just need to understand what's going on," he says. "They need to know that responses are being made." **CIO**

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Interview With a **Mob CIO**

The facts, the scams, are real. The CIO? Not so much. But here's how organized crime uses technology to make money.

AS TOLD TO SCOTT BERINATO

People call me a lot of things. Nobody would ever call me a CIO,

but after reading *CIO* magazine a little bit, I guess that's basically what I am. Maybe I'm a little younger than you. A little more techy. I know my routers and code.

Reader ROI

- :: How organized cybercrime operates
- :: How the Internet makes crime easier and more profitable
- :: Image spam and other new criminal technologies

Most of the guys I work with, they don't like computers. They get frustrated. Lots of times they want to shoot their computers, like that guy in Colorado did. I printed out that story and gave it to one of my guys. He loved it, especially the part where the guy hung the dead computer on the wall of his bar. "I love this Colorado guy," he said. And he passed it around to all the guys. "You have to read this story MIT gave me." Yeah, they call me MIT, like, "Let's ask MIT if we can set up an online account" or "Maybe MIT can make a website for that." A website for what? For making money, what else? Isn't that why anyone sets up a website?

Yeah, I deal with the same stuff you do. Same headaches. I'm constantly fixing stuff and trying to do whatever helps the bosses grow the business, as you call it.

Bosses. I mean, bosses are the worst, right?

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fashioned pump-and-dump scam but with a cool techno twist.

This wasn't mine, but I know a guy who knows the guy who set it up. Here's how he worked it.

First, he rented a botnet. That was for e-mail distribution. He pays, I don't know, say \$50Gs for a month, turns around and promises the bot-herder a taste in exchange for that month's usage and some guaranteed uptime. You know, he says, deliver me 10 million e-mail messages and I'll guarantee you some back-end cash.

So the bot-herder knows a kid who wrote this absolutely killer image spam application that creates the e-mail messages. Pays him a flat fee. I mean, the kid could've asked for a lot more, but a lot of these programmers are pretty young and dumb. You wave some cash and they think, "Flat-screen TV!" Anyway, he tells the kid to make the program create advertisements for pink-slip stocks, those unlisted ones that trade for pennies. It all gets done in like 15 minutes after they get some of the basic wording down.

So then this guy sets up offshore accounts online (in Brazil, I think) to collect the investments. His guys all buy something like 10,000 shares at 30 cents per. Then the botnet goes to work. Starts mass mailing the ads for the stocks. And the beauty part is those little messages get by all the spam filters because the filters are looking for text, but with the image spam all the filters see is a million different images, each one unique, even though they all say the same thing: Buy this stock. (For more on image spam, go to www.csoonline.com/read/040107/fea_spam.html.) Genius. Finally, enough people invest to drive up the price. Eighty cents a share. A buck. Two. Eventually, our guys sell, make a nice chunk of change, the stock tanks and the suckers who got in on the e-mail tip lose their shirts.

Like I said, a classic pump-and-dump, but back in the day it was a lot harder to do. It required a lot of legwork, relationships

with reporters and brokers. Compared to that, this is, like, nothing.

I know what you're thinking: Who believes an anonymous e-mail that says such-and-such company you've never heard of is at a quarter a share now but is heading to five bucks? Hey, I don't know, but you send out 10 million messages, you get 1,000 to invest, that's only, what? A hundredth of a percent? I'd say the sucker population is a lot bigger than that.

It was a great little business. One of those stocks hit six bucks! But then the feds sniffed it out and suspended trading on those penny stocks in March.

Maybe when things cool off, it'll pick up again. By that time, the spam filters will probably have adjusted and we'll have to go back to the programmers for their latest bots.

Everyone Wants ID... Just Not Their Own

The big money is in credentials.

Look, the world runs on credit, and what you need to get credit are personal credentials. That's what everyone is after right now. And that's where a lot of our investments are: credentials for lines of credit.

That TJX thing last January? No, not me. But let's say I had beers with someone who might have worked on that job. It sounds like the heist of the century, right? What, 40 million personal records? But really it's pretty basic stuff. If you want to get into the credentials market, you do three things: One, get inside access to someone who stores lots of personal data. Retail is great for that. Think about how many cards are swiped every second at those places. Two,

invest in antiforeshics, because once you're in, you want to stay invisible until you're done. (For more on antiforeshics, go to www.cio.com/article/114550.) Three, after you got the credentials, behave. I'll explain that one in a minute.

The papers say the wiseguys got into TJX, they got employee IDs, by intercepting wireless data flowing between cash registers, handheld price-checking devices and such. Maybe. But this is how I'd do it.

Inside access. That's easy. You spread some USB keys around. People see them and go, Cool, free dongle! Only when they plug them in, a little program installs some bots or keyloggers onto their machine. From there, you root around until you get deeper into the network. (There are other ways too. Dumpster diving for paper records and credit card statements. Paying off the custodial staff. This stuff is as old as time; computers just make it easier.)

After gaining access, it's time to invest in antiforeshics. Look, I don't care if they can see what I did as long as they can't see it was me that done it. We have this saying here about antiforeshics: Make it hard for them to find you and impossible for them to *prove* they found you. We've got a whole bunch of software that allows us to cover our tracks and keep us basically invisible while we're inside someone's system. What's great is a lot of antiforeshic tools are free. They're all over the Internet. We buy others, like encryption programs and data wipers like Evidence Eliminator. This guy I had beers with says a few guys are even experimenting with ways to make other guys look guilty. You know, set someone up, send the cops down the wrong path.

At that point, you install a little program that collects the credentials. Sometimes we use 'em; most of the time we sell 'em. We've been working on a subscription service. You pay for access to credentials for a certain period of time. We can get \$1,000 a month or more for a subscription pretty easy. That adds up.

But what we've run into—a big problem—is that lots of guys get their hands on this information and just start buying stupid stuff. They have no discipline. Look at TJX. Those guys got busted for using the credentials they lifted to buy gift cards for,

The world runs on credit and what you need to get credit are personal credentials. That's what everyone is after right now.

How to Protect Yourself

Don't want to be victimized by our Mob CIO? Here are eight questions to ask yourself when assessing your security vulnerabilities, at www.cio.com/article/109958.

CIO.com

HOW TO EXPECT THE UNEXPECTED



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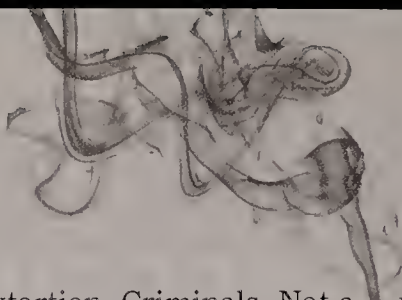
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what, like \$20Gs or something? I mean, you buy a \$20,000 gift card, someone's going to notice. So don't do Visa's job for them. All it takes is one jerk who gets some credit and buys a Bentley to take down an entire business. Find guys who can wait to use the credentials and then, when they do, use them in a way that looks normal.

They Gamble; We Don't

Right now, we're setting up a service out of Costa Rica. It's a—how do I put it?—it's a high-risk, high-return investment service for sports fans.

So how do I set up something like that? Like any project, with a lot of legwork. I've got to get my guy in Costa Rica to set up the back-end servers. Costa Rica's great because everything's available right in one building. I call my guy and say, "It's MIT. I need some stuff." He just walks down the hall to the ISP, gets servers and backups, and then goes upstairs to the Web developers. It's out-of-the-box, like calling up IBM Global Services or something. There's even a little online payment service outfit down there. We like it better than the big ones up here because those guys, they're better with international currency and security.

After we get all that going, we've got to do all the testing. I'm telling you, it's really not much different than those e-commerce projects I read about in *CIO*. We do the same due diligence. Same troubleshooting. Same thing with bosses yelling, "MIT, you got that site up yet? Super Bowl's in a few weeks. Site's gotta be up for that!"

They ask for some ROI up front, by the way. It's a little more informal than the way most of your readers do it. They'll ask, "Ballpark, what do we gotta spend?" I give them a number. They say, "What can we clear in an average month?" I give them another number. I'm not making these up either. I ask around. I mean, that's cost-benefit analysis right there, right?

Anyway, once that site's up and running it'll be a nice little business...for the overseas market, of course.

Even Crooks Need Security

I invest in top-notch security because, believe me, gaming sites are constantly

dealing with extortion. Criminals. Not a day goes by when a site doesn't have some Russian hacker launching a DDoS attack, asking for cash to call it off. We encrypt everything, and we've got pretty severe authentication for access. We don't out-source or contract the security. We keep it in-house.

I pay my security guy well. I'd say about 25 to 30 percent above what you'd pay. Met him at the Black Hat conference in Vegas a couple of years ago. I liked him right away because he wasn't presenting or bragging about what a hotshot he was. He was in the back, taking notes, trying to learn. Quiet. I knew right away he'd fit in.

I've also tasked him (that's how you say it, right?) with internal security. Basically, his job is chief privacy officer for a bunch of guys who *really* value privacy. All this technology—phones, the Internet—it's all great for making money, but the problem is, everything gets logged. My security guy has written and used lots of antforensic tools to erase those logs, and I'm comfortable telling my boss we have better privacy than the big banks. My security guy knows how to disable the GPS in our cell phones. He's building some routing programs, sort of like that Onion Router project that, like it says on their website, "prevents the transport medium from knowing who is communicating with whom" so that anything we send over the Internet is scrambled through different routes and hops all over the world, completely anonymous and untraceable. And everything, I mean *everything*, is encrypted. Say someone stole the servers we keep here at the home office. My guy designed it so that really only two people can access the data: me and him. We have the private keys and no one else does. Not even the boss.

My Kind of Guys

The guys I keep, or keep on a kind of retainer, are the ones that show me something extra. We had one guy who came to

us selling a great new way to set up temporary international cell phone accounts, using credentials bought in the identity market. Guys will pay a lot for a disposable international cell phone.

We bought some and were so impressed we decided to get into business with him. He set up the phones; we handled distribution. I asked the guy what else he was working on. He flips his laptop around and shows me his own website where he's auctioning off credit credentials to the highest bidder. Slick. I said to him, "You could be our R&D." He said, "Cool." And that was that.

Compared to you guys, I'm pretty lucky with talent.

My guys are way ahead on the technology. They work hard. They're innovative and entrepreneurial. I think they're some of the most talented IT staff around.

Alignment Among Thieves

Actually, there is one way you and I are different. I read all those stories in *CIO* about how hard you have to work to align technology with the business's goals. That's one problem I *don't* have. My bosses don't let me spend a dime on anything that's not going to make them money. Why should they? And I wouldn't even think about investing in a huge project that might fail to live up to expectations. I don't get play money to buy technology that doesn't work. I don't have vendors paying the freight to conferences at swank resorts to convince me to invest in something that's half-developed and overhyped. I never use jargon. I spend zero time doing PowerPoints.

Speculation? That's not part of our business model. So maybe I don't get the newest gadgets all the time but, man, I am *aligned*. With the business. With the bosses. There's really no other choice, you know? **CIO**

My bosses don't let me spend a dime on anything that's not going to make them money. Why should they?

CSO Executive Editor Scott Berinato can be reached at sberinato@cxo.com. To comment on this story, go to www.cio.com/article/117150.

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Cubik CTO
Greg Lindberg:
"If someone is
conservative, they're
never going to get
into this business in
the first place."

+



LESSONS FROM THE RED LIGHT WEB

Rarely acknowledged by the mainstream, adult and gaming sites collect a healthy percentage of Web traffic and account for a good deal of innovation too. **BY BEN WORTHEN**

Tim Valenti and Greg Lindberg are accidental pornographers.

When the two former advertising men started their own Web design company, Cubik Media, in the mid-1990s, one of their first clients was Eidos Entertainment, the company that makes the *Tomb Raider* video game. Part of the campaign used streaming video, but the new technology was not ready for prime time and almost no one had the high-speed connections necessary to view the content. But Valenti and Lindberg saw potential. On a whim, they started Nakedsword.com, an adult site for gay men, figuring that online video would save a potentially embarrassing trip to the video store. "We built some password-protected areas and threw up some videos, mainly as an experiment," says Lindberg, Cubik's CTO. Then something unexpected happened: "People started buying it left and right." Almost overnight, Nakedsword.com became 90 percent of Cubik's business.

THE TAKEAWAYS

- :: Why the red light Web is a nexus for innovation
- :: New Internet technologies
- :: Innovations in mobile content delivery and digital rights management

In the years since, Cubik has continued to innovate with online video. It was among the first to use Flash for streaming video, build digital rights management capability into its movies and use peer-to-peer networks for distribution. Most recently, Cubik is integrating a cutting-edge digital fingerprinting system that can spot copyrighted material posted by users on one of its sites, an adult version of YouTube. The system works by turning the sound waves from a movie's audio track into an image. Every time a user uploads a clip, the system makes a graph of the new audio and compares it to the graphs in its database. If the clip a user is trying to post matches a copyrighted one, Cubik takes it down.

"It's pretty amazing," says Lindberg. "There are lots of companies out there trying to solve this problem, but we actually have something that works."

On the Cutting Edge

Red light sites probably aren't places CIOs normally would look to find innovative IT. But the sex and gambling industries have always been at the forefront of technological innovation. During World War II, the illegal telephone network that bookies developed was more reliable than the one the War Department used, says Harold Layer, professor emeritus at San Francisco State University. And the pornography industry has helped select technology winners and losers for ages. In the 1980s, for example, demand for adult material gave VCR makers the economies of scale they needed to make their devices affordable, says Jonathan Coopersmith, a professor of technology history at Texas A&M University.

But past innovations pale in comparison to the rate at which the gambling and adult industries are blazing new ground on the Internet. Over and over again, the Web's red light district has either pioneered or adopted a technology before the mainstream. The first customers of Duocash, a now-defunct anonymous payment system that allowed customers to pay for online services with prepaid phone cards, were gambling sites. A random sampling of 400,000 queries on the early peer-to-peer file sharing network Gnutella in 2003 found that 42 percent were looking for porn (compared to only 38 percent looking for music). And content delivery for mobile devices is now dominated by the adult and casino industries to such an extent that 3G, the high-speed mobile communication network, ought to stand for girls, games and gambling.

Today, adult websites make up 12 percent of the Internet, according to Top Ten Reviews. These sites attract 72 million unique visitors a month (more than 28,000 people are viewing Internet pornography at any given second) and the sex sites' annual sales approach \$5 billion, higher than the combined revenues of the ABC, CBS and

RED LIGHTS, BIG NAMES

Under any light, money is still green

A naive view would be to dismiss the Web's red light district as composed solely of sleazy people and websites with ridiculous names. But if you scratch the surface, says Frederick Lane, author of *Obscene Profits: The Entrepreneurs of Pornography in the Cyber Age*, you'll find some extremely famous, well-known and established enterprises.

Major hotel chains such as Marriott and Holiday Inn profit to the tune of about \$190 million a year on the sale of adult movies, according to a report by Citizens for Responsibility and Ethics in Washington (CREW), a government watch-dog group. About 90 percent of this revenue goes straight to the bottom line.

According to CREW, major cable companies such as Comcast and Time Warner also make hundreds of millions a year selling pay-per-view pornography. And telephone companies earn close to \$500 million every year from phone sex. In the United Kingdom, \$41 billion Vodafone, one of the world's largest mobile telecom companies, has been frank about its decision to carry and process payments for pornography sent to mobile phones. Even good old General Motors was in the adult movie business (through its Direct TV subsidiary) until it sold that unit in December 2003.

Technology companies in the Internet world are also involved with pornography by helping to maintain the networks and channels by which it's delivered. Of course, those companies have a good excuse for not calling attention to their role.

"On the Internet," puns Lane, "all bits are naked."

—B.W.

NBC television networks. (Coopersmith warns that people should take numbers measuring the size of the adult industry with a grain of salt. "It's like sex in general," he says. "People exaggerate.")

Meanwhile, the online gambling industry has made its sites incredibly sticky. According to Nielsen/NetRatings, visitors to the top gambling sites spend an average of 13 hours at the sites a month. The worldwide average for all sites is just 28 minutes.

There are several reasons why the red light Web embraces innovation. Its target audience—males, 18 to 50—is a demographic that gravitates to new technology. Good technology is also a business necessity. "[Gambling and adult companies] have been forced to be innovative by constant attempts to legislate them away," say Lawrence Walters, a First Amendment lawyer at the firm Weston, Garrou, DeWitt & Walters. In fact, the U.S. government passed a law late last year that makes it illegal for Americans to spend money at online casinos, a move that devastated the industry. The risk of prosecution has also kept gambling and adult sites from growing into large corporate entities. (See "Red Lights, Big Names," this page.) "As a result they've tended to remain small and entrepreneurial," Walters says.

Technology is also one of the few ways that sites can differentiate themselves. "We have to compete with free porn," says James Cybert, director of IT for Hotmovies.com. "What makes us competitive is being virus-free and the consumer experience. If you aren't able to keep up with the technology you'll be beat over the head."

Or as Calvin Ayre, founder of the online gambling site Bodog.com, says, "Technology is our lifeblood."

Red Light Technologies

So what are the latest technologies developed or perfected on the red light Web that will eventually make their way into the mainstream? *CIO* talked to IT leaders at some leading adult and gambling sites so you don't have to. These are some of the technologies that they are looking at.

► IPTV; MPEG-4; Smart Search

Scott Piper, CIO of New Frontier Media (one of the few publicly traded adult companies), is keeping an eye on IPTV—television delivered over the Internet. Over the next five years, he predicts that the distinction between televisions and computers will disappear. There are three models for how this could happen: set-top boxes that connect to the Internet (with the user experience controlled by a cable company); computer monitors in the living room that run media software (Piper says that Vista may finally make this viable); and appliances that forward computer content to a television, like the new Apple TV.

Of course, IPTV content won't appear on the Internet by itself. That will put CIOs in the TV business. "IPTV will blur the line between the data center and the broadcast center," says Piper.

To make your data available to these new IPTV consumers, CIOs will have to digitally encode everything. Most of the major film studios are just beginning that process; New Frontier began digitizing its movies five years ago. One of the technologies New Frontier is using for this is MPEG-4, an emerging compression standard. Videos compressed with MPEG-4 take less space to store and less bandwidth to deliver. MPEG-4 also has built-in digital rights management capability.

But compressing and posting content is the easy part. With every program available at any moment, how will users find programs? Piper believes that search will be the killer app of IPTV. To that end, New Frontier is obsessive about metadata, watching every frame of every video it digitizes and recording as many attributes as it can. Customers can use these metadata tags to refine their searches until they find precisely what they're looking for. (For example, if you have a thing for blondes on the beach, a search on New Frontier's adult website Ten.com for "clothing-accessories-sunglasses," combined with "setting-outdoors-beach," and "physical-hair-blonde," returns two 15-minute clips, the fourth scene from *Lock, Stock and Two Smoking Bimbos 2* and the first scene from *Pick Up Lines 82*.)

IPTV will require this kind of search on steroids. "There will be so much choice that the average consumer will be frustrated without concise recommendations," says Piper. New Frontier is experimenting with a search that combines what people are looking for with information about past preferences. "This will not only be a great up-sell vehicle but also an avenue by which we can broaden people's tastes," Piper says.

► Mobile Content Delivery

One of the biggest areas of growth in the adult space is delivering content to mobile phones. There are more than three times as many mobile phones in the world as there are computers. Plus, people always have their phones with them. And that's important. "By its very nature, arousal is impulsive," says Julia Dimambro, managing director of Barcelona-based Cherrysauce, which delivers adult material to mobile phones. "Mobile brings immediate gratification. With the Internet, you have to wait until you get home."

Dimambro points out that what works on television and the Internet won't necessarily work on the phone's small screen. For starters, the screen dimensions are different, which means existing video form factors, as well as other content, have to be reconfigured to fit or be specifically conceived with the mobile phone in mind.

One type of mobile promotion meeting with some success is "bluecasting." For example, an advertiser will have a billboard in Heathrow Airport that says that anyone interested in learning about a particular product (say a Range Rover SUV) should turn on their phone's Bluetooth capability. The billboard then detects the phone and sends it an advertisement or promotion for the product.

One of the services that Cherrysauce is experimenting with is putting plasma screen TVs in pubs. The screen shows a picture of a sexy woman and then prompts viewers to switch on the Bluetooth on their handset.

This then allows the "bluejacking" box at the side of the TV screen to send content directly to the handset. Another marketing initiative places advertisements on TV or in print and asks viewers to send a text message to a special short code number, like 12345, if they want to see more. If they do, a link to download the content is returned to their handset via SMS or WAP message, sometimes with a charge attached. This is a process called premium SMS, and it's a way of giving customers access to the mobile Web without requiring them to type in complicated URLs. Each short code number is registered with the mobile service providers. "If the user sends his text message to an adult short code, he is checked automatically to see if he has age-verified with his network," such as \$41 billion British mobile giant Vodafone, explains Dimambro. "If not, he is sent to the age verification service in order to access the content."

► New Programming Languages

The user experience is central to the success of any site. And so red light sites are trying to find the latest and best programming languages in order to improve the way their sites look and feel.

"Java is really robust," says Bodog founder Ayre. "But it's a pretty expensive development platform. We're starting to see the emergence of a new wave of Web-savvy languages." The one he likes the best right now is Ruby on Rails, an open-source language

"What makes us competitive is being virus-free and the consumer experience. If you aren't able to keep up with the technology, you'll be beat over the head."

—James Cybert, director of IT, Hotmovies.com

that was designed to facilitate the development of Web applications with database back ends. "There's nothing that Rails lets us do that we can't do with other tools," says Ayre, "but Rails holds the promise of doing it faster, and the more productive our product development teams are, the more features we can deliver."

Bodog is also moving away from Java toward Flash for online games such as poker. Building the games with Flash means that users can play them without having to download anything. "Downloading is an entry barrier that Flash eliminates," says Ayre. "We know that given a choice, most players will choose a Flash version of a game versus a downloadable one." And now Flash is robust enough that Bodog can build sophisticated games with it.

► Personalization and Customization

There are so many different red light sites competing for dollars and eyeballs that the only way to succeed is to build a relationship with the user, and gambling and adult sites have managed to personalize the user experience to an impressive degree.

"Over the last few years we've seen our design team evolve into a user experience department," says Ayre. This group takes into account everything from color theory to informational hierarchies. For example, one of the first things Bodog learned when it launched the latest version of its site was that people don't like red poker tables. So the company came up with a tool that lets users choose the color they want their table to be, and traffic picked up.

At Hotmovies.com, IT Director Cybert has built a drag-and-drop tool that lets his customers compile scenes or parts of scenes from their favorite videos. So far, customers have made 4,800 compilation movies consisting of more than 350,000 clips.

And not only does the compilation function allow users to create their own highly personalized experience, it gives Hotmovies data on the kind of videos each user is looking for. "You have to understand your audience and give them what they want," says Cybert.

There are also ways to customize a site even if the person visiting has never been there before. Cubik Media uses geotargeting, a technique that locates people based on their IP addresses, to tailor the user experience. At its most basic, geocoding allows Cubik to display the site in the user's native language. But it also presents a chance to localize the site. "Someone from Japan wants to see Asian girls," says Lindberg. "People want an experience that feels like their culture."

Red Lights, Best Practices

Historically, gambling and adult sites have been more willing than their mainstream counterparts to work with startup vendors.

A HISTORY OF INNOVATION

Technologies spawned or matured in the Web's red light district

Streaming video. YouTube made it famous; adult movies made it economically viable.

Videoconferencing. Businesspeople increasingly use online chat and embedded video rather than conducting face-to-face meetings. Before that, it was used to communicate with *Live! Girls! Now!*

Digital rights management. Through their disregard for intellectual property rights, adult sites helped spur the music and film industries to apply DRM to their online content.

E-commerce. The content on adult sites was so compelling (to some), it helped people overcome their fear of using a credit card online, according to Frederick Lane, author of *Obscene Profits: The Entrepreneurs of Pornography in the Cyber Age*. —B.W.

"They're much more willing to fund new technology," says Hassan Kotob, CEO of North Plains Systems, a digital asset management vendor. "At the end of the day, content is all that they have so an innovative technology can go straight to the bottom line."

"We're looking for solutions that will allow us to improve by large margins," says New Frontier CIO Piper. "We won't buy faster storage arrays if they only give us 10 percent improvements. We're looking for 50 percent or greater." Examples of new technologies that New Frontier has invested in are high-speed network storage that allows the company to stop writing to tape because speed went up by a factor of 10, and backup systems that don't take a storage array offline while the backup is running.

Another red light best practice is to look for vendors that use open source. Since sites are open 24/7 (late-night hours are extremely profitable on the red light Web), "if we ever run into critical issues we need them solved now, not two hours from now," says Bodog's Ayre, who has learned that if he wants his people to be able to fix something, they need to have access to the source code.

"We absolutely could not get a couple of our vendors to address an issue that was crippling us," says Ayre. "Under peak loads, the entire site became nonresponsive. We had no choice but to decompile the systems in question and fix the problem ourselves. This was probably one of the biggest drivers pushing us to adopt open-source solutions for our most critical systems."

The red light Web has all the hallmarks of a new technology incubator. It has a technology-savvy target audience, and "if someone is conservative, they're never going to get into this business in the first place," says Lindberg.

In other words, the red light Web is a place where CIOs might be able to learn something. And that may justify an occasional trip...you know, for the technology. **CIO**

Talking About Innovation

You don't have a red light model but you still need to innovate. Well, CIO Executive Editor Elana Varon is all about innovation. Keep up with her blog, **PRACTICAL INNOVATION**, at advice.cio.com/practicalinnovation.

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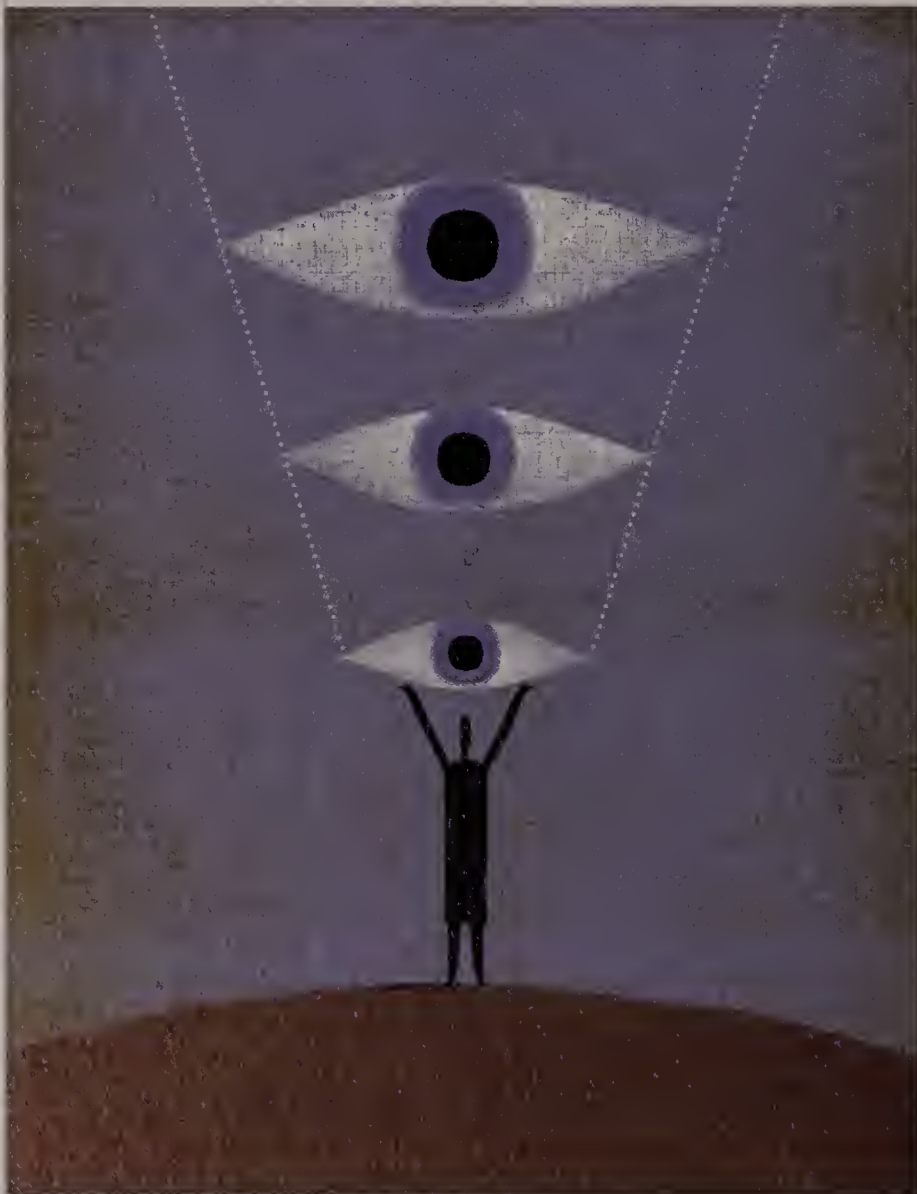
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IT's Corporate Vision

The CIO of Toyota Motor Sales USA combined focus groups, critical analysis and information integration to bridge Toyota silos, craft a long-term vision and cultivate a strategic orientation

BY BARBRA COOPER



Too often CIOs sit and lament that their business doesn't provide them with a clear strategy to map to—something complete, enterprisewide and wrapped in a nice leather binder. I was tired of being one of these CIOs. At Toyota, we were making significant investments in functional systems for discrete parts of the business without an overall view either of how these systems might be better leveraged across the supply chain or how the business would need to operate over the coming years. IT was all about service, alignment and value; we had no rights to influence the strategic direction of the business. We were always behind the business waiting for the handoff. I determined to change that.

I wasn't so overt as to say I'm going off to establish a beachhead in the strategic planning department. I simply started a series of focus groups with individuals from the planning side of IT and midlevel managers from the planning organizations and line operations on the business side. I deliberately started at the middle level of the organization. When you get that level of people together and make it comfortable for them to speak up, they will share where they see gaps and opportunities. In fact, they were pleased that someone was asking for their input. And, because managers from these different organizations generally work separately, they were happy to be together in a room with their peers from across the company. To take away any pressure, we asked them to focus 10 to 15 years out. If you're talking three years out, it's more real. Farther out, you can fantasize a journey, but use the train tracks of the business to get you there.

One area we discussed was quality. We asked, Can we

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maintain our relentless focus on quality with larger volumes and increased complexity of product lines? What would that mean 10 to 15 years from now to our current business processes, our customers and our application portfolio? What effect would telematics have, when every Toyota on the road is equipped to send maintenance and performance data back to the company? We looked at how we would connect from Japan all the way through the supply chain to our U.S. dealers and customers.

After these meetings, we had enough information to coalesce 10 business themes. I brought the results to the top executives at the company. I was careful to frame the presentation as a request for advice. I told them, "As you know, we have a real challenge in IT with more demand than supply, and we want to try to get ahead of the curve. The more I can anticipate, the better we will be at fulfillment." I wanted to get them

comfortable talking about the future and get their opinions about the business drivers I was putting on the table. They suggested some edits and signed off on the strategic vision.

Map Your Business Strategy

Download Barbra Cooper's template for **ALIGNING BUSINESS STRATEGY WITH I.T.** at www.cio.com/article/108251.

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A New Strategic Picture

My next step was to use those drivers as compass points in a model that would frame the issues for the top executives. We mapped aspects of our business, such as the supply chain, to their associated organizations (such as aftermarket parts) and business processes, as well as the affiliated systems and their fully loaded costs. (We had done a detailed audit of all of our systems costs, so those data points were accessible to us.) Then we ran a regression analysis to derive risk parameters such as the age and cost of systems and the skill sets needed to support them. We plotted points of risk on the model.

When we were finished, our executives could see on a single sheet of 6-foot-by-4-foot paper everything they needed to draw conclusions regarding the risk associated with our strategic business drivers and the systems that support them. For the first time our executives could see how changing business conditions anywhere along the supply chain would affect their IT portfolio. We also created a second layer of information to show the real-time situation and the short-term factors in play.

The conversation changed. The executives were now able to see how applications—whether our 30-year-old legacy systems or the technology we were planning to bring in—mapped to their business drivers. They now understood the correla-

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tion between their ability to go to market, the cost impacts and how many competing interests would be vying across the enterprise at the same time. One executive, contemplating the challenges a few years down the road, looked at his watch and joked, "Thankfully, I'll be retired before then."

Connecting Silos

Four years have passed since I began the effort to make IT a core element of our strategic planning process. I've realized that you can't change the fact that silos exist—that the head of marketing is going to worry about marketing, and the head of engineering is going to worry about engineering. But you can help them to articulate together a set of broad, long-term objectives. We have succeeded at getting executives comfortable talking about strategic issues at an enterprise level. Meanwhile, they appreciate better the complexity and challenge of integrating business processes, IT and go-to-market strategies.

My role has changed. Fifty percent of my focus is now on business engagement and strategy. My attention to the future of the business has also helped focus my attention on the next generation of IT leaders in the company—the people who will

The head of marketing is going to worry about marketing, and the head of engineering is going to worry about engineering. But you can help them articulate a set of broad, long-term objectives.

succeed me. I want to see a day when, in an executive committee meeting, we CIOs are no longer asked solely about how our projects are going and the condition of our operations, but are also asked for our strategic perspective. Business executives should see the CIO as the person with the best overview of company operations—and thus the person best positioned to look strategically at how to optimize her company's go-to-market capabilities. We are getting there, but we have to drive ourselves. **CIO**

Barbra Cooper is group VP and CIO at Toyota Motor Sales USA. She is also a member of the CIO Executive Council. Go to www.cio.com/cec/strategic_cio/ to find more Strategic CIO columns and tools.



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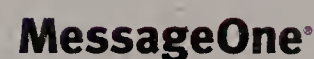
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5 Things I've Learned

AS TOLD TO MARGARET LOCHER

Futurist and technology pundit **Esther Dyson** focuses on emerging technologies, companies and business models. A founding member of ICANN, today her company, EDventure, invests in startups.

It's important to question hype.

I'm mostly a skeptic about emerging technologies. I started as a fact checker at *Forbes* and learned to be specific and skeptical.

Blogs and social networking are overhyped.

I write a blog. I know from experience that they're not the ultimate destiny of mankind. And I don't think it's important for every executive or tech expert to have one. A blog is a useful outlet for someone who has things to say and wants to publish them. In terms of the qualities a blog should possess, authenticity is pretty high on my list.

A ghost-written blog is not the real thing. I do have one dif-

ficulty with blogging: fact checking. Sometimes the process slows down the blog. Or I get too busy and don't post because I can't check all the facts. I can't see posting stuff that could be inaccurate (as opposed to opinionated).

I don't try to predict the future.

I just try to understand the present. But since you asked, one place I was really wrong was about privacy—or more specifically, people's reaction to the issue. I thought the public would be much more concerned and careful. They are concerned about it but are still careless. They're both willfully ignorant and paranoid! But I am having my own problems trying to figure out how to install an upgrade from Symantec. You could argue that the vendors still don't make it easy enough.

Established companies can learn a lot from startups.

Startups can teach mature companies how to have a sense of

humor and to be responsive and flexible. And to focus more on customers than on internal politics.

ICANN taught me a lot.

There's not much need for a lot of central policy direction on the Net. ICANN, the nonprofit entity that oversees the Internet's systems and protocols, did the wrong things in that regard. It designed a market with too much regulation and, ironically, too little enforcement. Its rules are so rigid, and prices are set so that registries and registrars can't generally compete on anything other than sleazy marketing practices. There needs to be more disclosure and real penalties for breaking the rules, but overall fewer rules. What did I learn from that experience? Fight harder for transparency. Avoid centralized power. And don't trust people to do the right thing; design systems that help them to do so.

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